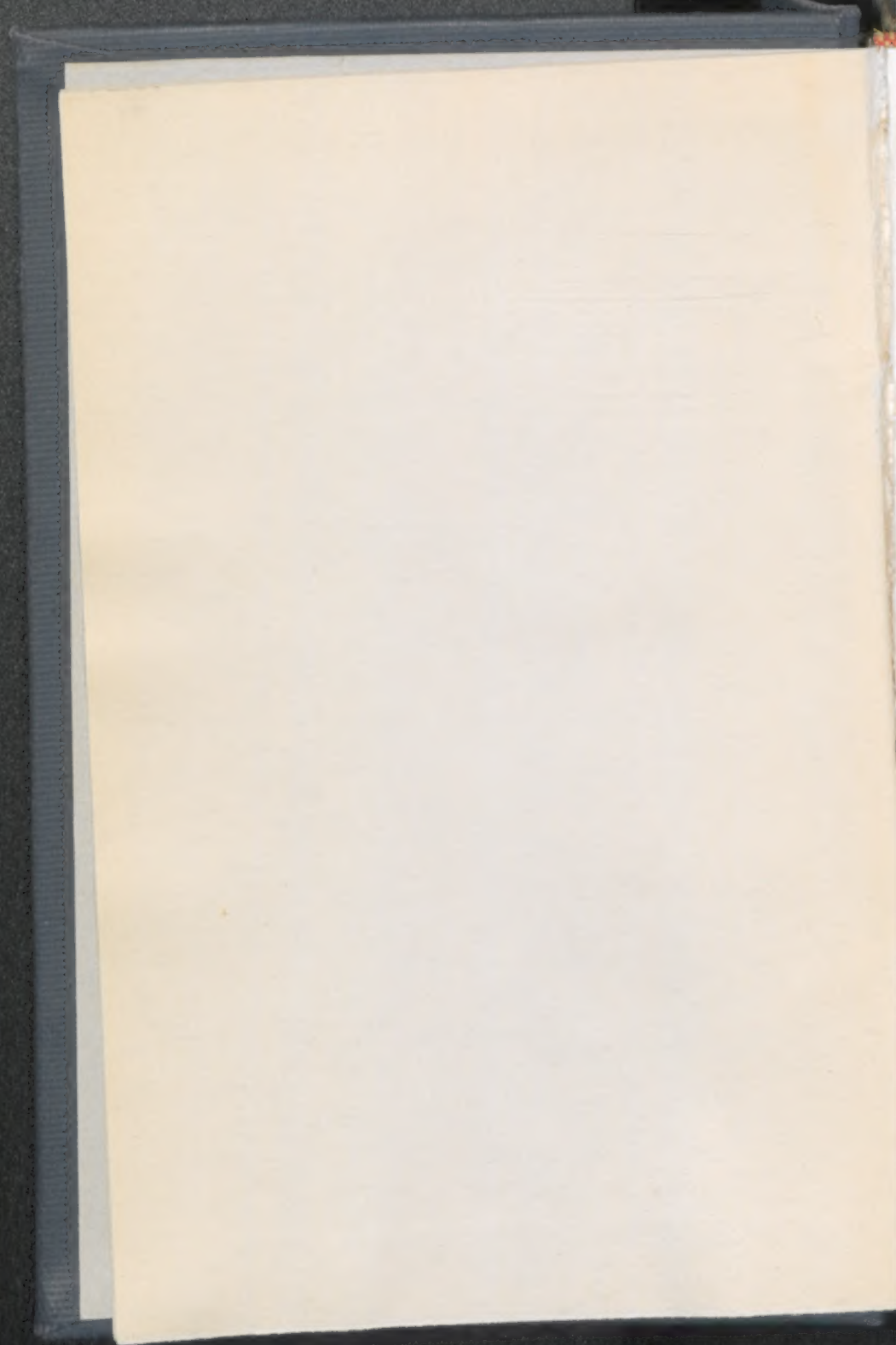


THE  
GEORGE  
WASHINGTON  
UNIVERSITY

CATALOGUE







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THE  
GEORGE  
WASHINGTON  
UNIVERSITY

THE SUMMER SESSIONS

1957

THE SUMMER SESSIONS

WASHINGTON, D.C.

BY THE UNIVERSITY



THE SCOTTISH SABBATH

1927



THE  
GEORGE  
WASHINGTON  
UNIVERSITY  
BULLETIN

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VOL. LVI

No. 1

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THE SUMMER SESSIONS

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WASHINGTON, D. C.

PUBLISHED IN JANUARY  
MCMLVII

BY THE UNIVERSITY



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1957/58



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THE UNIVERSITY OF WASHINGTON  
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## CALENDAR OF THE 1957 SUMMER SESSIONS

Date	Day	Occasion
June 17 ....	Monday .....	Registration for the eight-week term*
June 18 ....	Tuesday .....	Classes begin
July 4 .....	Thursday .....	Independence Day. Holiday
Aug. 9 .....	Friday .....	Eight-week term ends
		Last day for receiving theses for the Master's degrees and for the professional degrees in Engineering to be conferred in October
Sept. 6 .....	Friday .....	Last day for receiving dissertations of candidates for the degrees of Doctor of Philosophy and Doctor of Education to be conferred in October

### THE LAW SCHOOL

June 7 .....	Friday .....	Registration for both sessions
June 10 .....	Monday .....	First session classes begin
July 4 .....	Thursday .....	Independence Day. Holiday
July 23 .....	Tuesday .....	End of first session
July 24 .....	Wednesday .....	Special registration for students attending second session only
July 25 .....	Thursday .....	Second session classes begin
September 2 ..	Monday .....	Labor Day. Holiday
September 7 ..	Saturday .....	End of second session

### THE SCHOOL OF EDUCATION—SPECIAL SESSIONS

June 10 .....	Monday .....	Registration and first day of classes of the pre-session and twelve-week evening session
June 28 .....	Friday .....	Pre-session ends
July 1 .....	Monday .....	Registration and first day of classes of the special six-week session
July 4 .....	Thursday .....	Independence Day. Holiday
Aug. 9 .....	Friday .....	Special six-week session ends
Aug. 12 .....	Monday .....	Registration and first day of classes of the post-session
Aug. 30 .....	Friday .....	Twelve-week evening session and post-session end

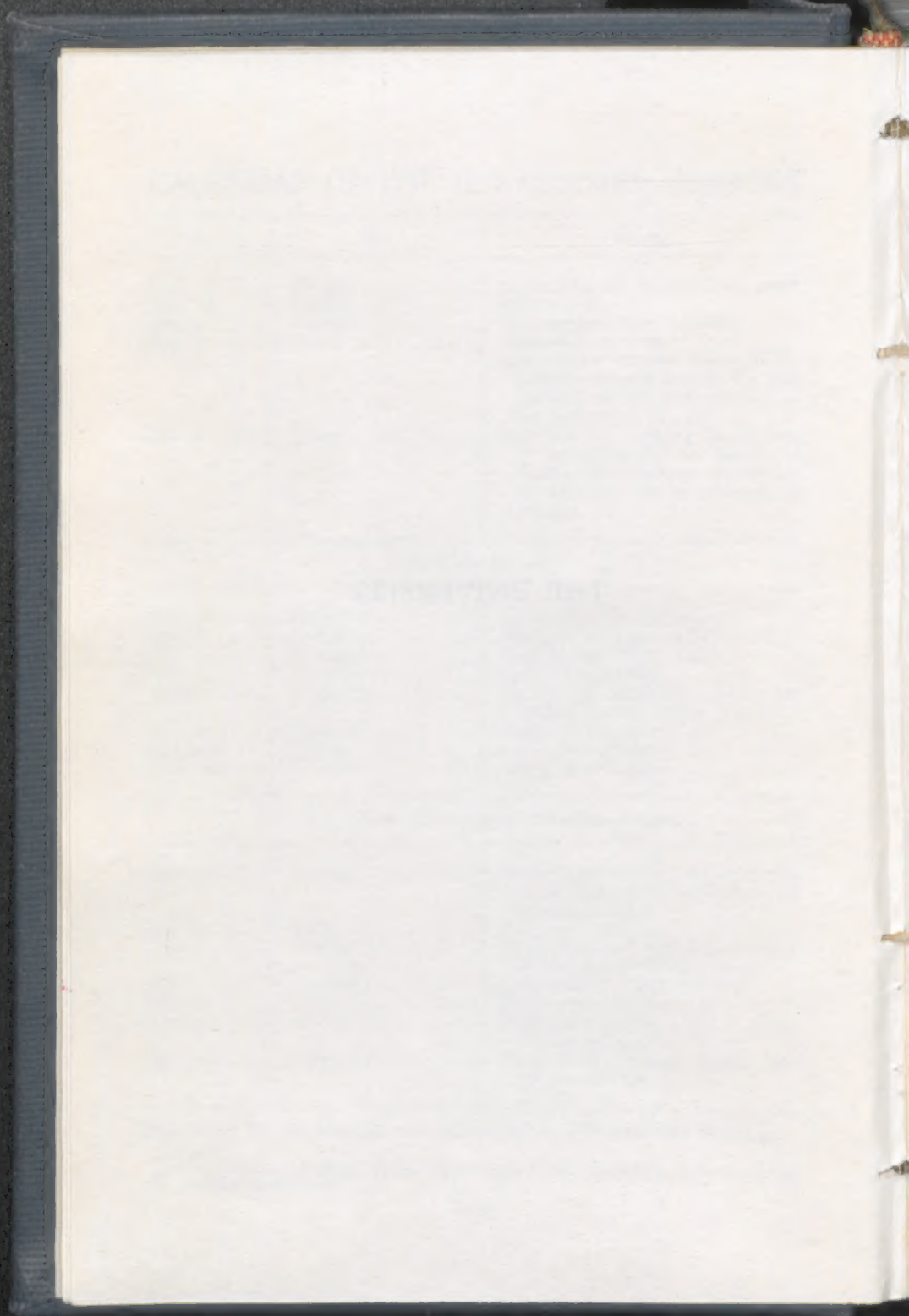
Registration for the academic year 1957-58 will be held September 19 and 20.

\* For all schools and colleges offering courses in the Summer Sessions except the Law School and the School of Education.



THE UNIVERSITY

[illegible]





## THE BOARD OF TRUSTEES

The Board of Trustees of the University is composed of the President of the University ex officio and the following persons by election:

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\* Nominated by the Alumni.

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John Gage Allee, Jr., Ph.D., *Assistant Dean of the Division of University Students*

## THE UNIVERSITY

### HISTORY AND ORGANIZATION

The idea of a university in the Capital of the Nation was sponsored by George Washington, who during his public life urged the establishment of such an institution and who in his will left fifty shares of stock in the Potomac (Canal) Company for the endowment of a university to be established in the District of Columbia "to which the youth of fortune and talents from all parts thereof might be sent for the completion of their Education in all the branches of polite literature;—in arts and Sciences,—in acquiring knowledge in the principles of Politics & good Government".

Columbian College in the District of Columbia was chartered by an act of Congress of February 9, 1821. In 1873 the name was changed to "Columbian University" and in 1904 to "The George Washington University".

The George Washington University includes fourteen colleges, schools, and divisions, as follows:

The Junior College offers the work of the first two years of the four-year college program in the liberal arts and sciences and two years of preprofessional work. Each of these curricula leads to the degree of Associate in Arts. It also offers two-year terminal curricula. Those in Accounting and Secretarial Studies lead to the degree of Associate in Arts; those in Home Economics, Medical Technology—Basic Course, and Physical Science lead to the degree of Associate in Science.

Columbian College offers the work of the junior and senior years of the four-year college program in the liberal arts and sciences leading to the degrees of Bachelor of Arts and Bachelor of Science. It also offers the studies leading to the degrees of Master of Arts and Master of Science in the fields of the liberal arts and sciences.

The Graduate Council offers a program of advanced study and research leading to the degree of Doctor of Philosophy.

The School of Medicine offers work leading to the degree of Doctor of Medicine.

The Law School offers professional and graduate courses leading to the degrees of Bachelor of Laws, Juris Doctor, Master of Laws, Master of Comparative Law, and Doctor of Juridical Science.

The School of Engineering offers courses leading to the degrees of Bachelor of Civil Engineering, Bachelor of Electrical Engineering, Bachelor of Mechanical Engineering, Bachelor of Science in Engineering, Master of Engineering Administration, and Master of Science in Engi-



neering. It also directs work leading to the professional degrees in the fields of civil, electrical, and mechanical engineering.

The School of Pharmacy offers courses leading to the degrees of Bachelor of Science in Pharmacy and Master of Science in Pharmacy.

The School of Education offers undergraduate programs leading to the degrees of Bachelor of Arts in Education, Bachelor of Science in Home Economics, and Bachelor of Science in Physical Education, and graduate studies leading to the degrees of Master of Arts in Education and Doctor of Education.

The School of Government offers undergraduate programs of study in Foreign Affairs, Accounting, Business Administration, and Statistics, leading to the degree of Bachelor of Arts in Government. Graduate work is offered leading to the following degrees: Master of Arts in Government in the fields of Foreign Affairs, Economic Policy, Accounting, Business and Economic Statistics, Counseling, and Psychometrics; Master of Arts in Public Administration; Master of Arts in Personnel Administration; Master of Business Administration; and Doctor of Business Administration.

The College of General Studies includes the following divisions: the Off Campus Division, the Campus Division, and the Division of Community Services. The college is designed for adults, and sponsors a program of credit and non-credit courses throughout the year.

The Division of University Students makes available courses for mature students not candidates for degrees in this University.

The Division of Special Students makes available courses for students in the process of qualifying for degree candidacy.

The Division of Air Science offers a program of Air Force ROTC training which is integrated with the curricula of the colleges and schools of the University and leads to appointment as a commissioned officer in the United States Air Force Reserve.

The Summer Sessions.

#### ACADEMIC STATUS

The George Washington University is accredited by its regional accrediting agency, the Middle States Association of Colleges and Secondary Schools. This is important to students who wish to transfer credits from one institution to another.

The University is on the approved list of the American Association of University Women and is a member of the College Entrance Examination Board.

The Law School is a charter member of the Association of American Law Schools and is approved by the Section of Legal Education and Admissions to the Bar of the American Bar Association. The School

of Medicine is a member of the Association of American Medical Colleges, and is one of the medical colleges which have been continuously approved by the American Medical Association. The School of Pharmacy is accredited by the American Council on Pharmaceutical Education as a Class "A" school. It is a member of the American Association of Colleges of Pharmacy. The School of Engineering is on the accredited list of the Engineers' Council for Professional Development. The School of Education is a charter member of the American Association of Colleges for Teacher Education.

#### LOCATION

The George Washington University is in downtown Washington, four blocks west of the White House and east of the Potomac River with its extensive parkway. Readily accessible to the University are many of the departments of the Government, including the Department of State, the Department of the Treasury, the Department of Justice, the Department of the Army, the Department of the Navy, the Department of the Interior, the Department of Agriculture, the Department of Commerce, and the Department of Labor; as well as the National Archives, the Capitol, the Library of Congress, the National Academy of Sciences, the Pan American Union, the National Gallery of Art, and the Corcoran Gallery of Art.

#### EDUCATIONAL FACILITIES

Buildings, grounds, and equipment of the University are valued at approximately \$20,000,000. The buildings of the colleges, schools, and divisions offering Summer Sessions work are in the vicinity of Twenty-first and G Streets NW.

*The University Library.*—The University Library contains 312,000 volumes and, with the exception of the law and medical collections, is housed in the Library Building.

Regulations governing the use of the library, the circulation of books, and the use of reserve books and periodicals are available at the service desks of the Library.

#### OTHER LIBRARY FACILITIES IN WASHINGTON

The student has access also to the Library of Congress, the Public Library of the District of Columbia and its branches, the Library of the Pan American Union, the Library of the Bureau of Railway Economics, the Library of the United States Department of Agriculture, the Library of the United States Office of Education, the National Library of Medicine, the Library of the Smithsonian Institution, and many other great special collections of the government departments.



RESEARCH FACILITIES OF WASHINGTON

The arrangement of the summer schedule of classes permits the full-time student to avail himself of the opportunity to study, at first hand, the working of the Federal Government and so to form a background for intelligent and useful citizenship.

In the departmental libraries of the Federal Government are a multitude of reports made by eminent specialists in all fields of science on the results of study and research in the bureaus, experimental stations, laboratories, museums, and observatories of the Nation.

In addition to the governmental collection the student has access to the research facilities of such scientific and educational groups, whose headquarters are situated in Washington, as the Carnegie Institution, the American Council on Education, the American Council of Learned Societies, the National Academy of Sciences, the National Research Council, the National Education Association, and the National Geographic Society.





THE SUMMER SESSIONS  
1957





## STAFF OF INSTRUCTION IN THE SUMMER SESSIONS

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 Grover LaMarr Angel, A.M., Ed.D., *Associate Professorial Lecturer in Education*  
 Carville Dickinson Benson, A.B., LL.B., S.J.D., *Professor of Law*  
 Wilbur Earle Benson, M.B.A., *Assistant Professor of Accounting*  
 Lee Sheward Bielski, A.M., *Assistant Professor of Speech*  
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 Charles William Cole, Ph.D., *Professor of American Literature*  
 Mary Jane Cook, A.M., *Instructor in English Composition*  
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 Robert McKinney Cooper, Ph.M., J.D., *Associate Professor of Law*  
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 Ronald Bettes Thompson, Ph.D., *Associate Professor of European History*  
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Curtis Edward Tuthill, Ph.D., *Associate Professor of Psychology*  
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Helen Zhemchuzhnaya Yakobson, B.S., *Assistant Professor of Russian*  
Peter Zouboff, Ph.D., *Lecturer in Russian*



## THE SUMMER SESSIONS

The work of the Summer Sessions has been planned to meet the needs of full- and part-time students.

During the summer of 1957, courses are offered in the Junior College, Columbian College (the senior college), the Law School, the School of Engineering, the School of Pharmacy, the School of Education, the School of Government, and the Division of Air Science.

### ADMISSION

An applicant for admission must obtain from the Office of the Director of Admissions an application blank which he must fill out completely and return with the application fee of \$3. A recent photograph, with signature, of the applicant must be attached to the blank.

### ENTRANCE REQUIREMENTS

#### The Student Seeking a Degree

An applicant from a secondary school must send the high school record form furnished by the University to his high school principal, with the request that the principal fill out the form and mail it direct to the Office of the Director of Admissions.

An applicant who has previously attended an institution of higher learning should request the registrar of that institution to mail direct to the Office of the Director of Admissions a transcript of his record. If he has attended more than one such institution he must request the registrar of each institution to send to the Office of the Director of Admissions a transcript of his record, *even though credits were not earned*, together with an honorable dismissal.

Entrance requirements are stated in this bulletin under the various colleges, schools, and divisions.

#### The Student Not Seeking a Degree

Students 21 years of age or over who are not interested in working for a degree in this University may be considered for admission to the Division of University Students to take courses for which they have adequate preparation, as evidenced by previous scholastic records.

Students under 21 years of age who meet the entrance requirements of the Junior College but who are not seeking degree candidacy at this University may be admitted to the Division of University Students to pursue programs of study approved by the Dean.

In special instances, with the permission of the instructor, a person who has been admitted to the University may be registered as an auditor in a class without being required to take active part in the exercises or to pass examinations, but no academic credit will be allowed for such attendance. Students in good standing and matriculated for degrees in other institutions who wish to take certain courses in this University will be admitted to the Division of University Students for the summer only, to the extent that the facilities permit. In such cases transcripts of record are not required.

#### REGISTRATION

Before a student may register he must have satisfied the Office of Admissions that he is qualified to enter the University.

A student previously matriculated in the University but not in attendance during the term preceding this registration must file an application for readmission in advance of registration.

Registration for both sessions of the Law School summer term will be held June 7. *Summer students planning to take the New York Bar examination must register at this time for both sessions and complete both.* Students wishing to attend only one session may register on June 7 for the first or second session, or register on July 24 for the second session. Tuition fees will be payable by the session.

For registration, students should report to the Office of the Registrar,\* Building C, 2029 G Street NW., between 9:00 A.M. and 7:00 P.M., on the dates stated in the Calendar.

#### CHANGES IN PROGRAM OF STUDY

Changes in programs of study may be made only with the permission of the adviser or major professor and the dean or director of the college, school, or division concerned.

#### FEES AND FINANCIAL REGULATIONS

By authorization of the Board of Trustees, the following fees have been adopted:

##### TUITION FEES

For each semester hour† for which the student registers (except for work in the Law School, for courses in Departments of Instruction in the School of Engineering, for courses in the College

\* Registration for the Law School is conducted in Stockton Hall, 720 Twentieth Street NW.

† Payment of tuition for the Master's thesis entitles the candidate, during the academic year of registration, to the advice and direction of the member of the faculty under whom the thesis is to be written. In case a thesis is accepted, an additional semester's tuition must be paid without further tuition payment. If the preparation of the thesis extends beyond the second semester year, it must be registered for credit and tuition paid on the same basis as for a repeated course.



of General Studies, for work toward a Master's degree in Engineering, and for work taken by a candidate for a Doctor's degree) .....	\$ 17.00
For each semester hour for which the student registers in the Law School .....	19.00
For each semester hour for which the student registers for courses in Departments of Instruction in the School of Engineering .....	18.00
For the degree of Doctor of Philosophy, Doctor of Education, or Doctor of Business Administration:	
For work* leading to and including the Council Fellowship or General examination† .....	51.00
For work leading to and including the final examination† .....	51.00
For the degree of Doctor of Juridical Science:	
For work leading to and including the final examination† .....	51.00
For the degree of Master of Engineering Administration:	
For work leading to and including the Comprehensive Examination† .....	60.00
For the degree of Master of Science in Engineering:	
For work leading to and including the Comprehensive Examination† .....	65.00

## ADDITIONAL COURSE FEES

In certain courses additional fees such as laboratory and material fees are charged as indicated in the course descriptions. These fees are due with the tuition fee for the course. Breakage of apparatus is charged against the individual student. When breakage is in excess of the normal amount provided for in the laboratory fee, the individual student will be required to pay such additional charges as are determined by the department concerned.

## GRADUATION FEES

When the degree of Associate in Arts or Associate in Science is granted .....	10.00
When a degree other than the Associate in Arts or Associate in Science degree is granted .....	25.00
When an Advanced Professional Certificate in Education is granted .....	25.00
For the Binding Master's Thesis .....	6.00
For the Printing Summary on Departmental Examination .....	5.00

## SPECIAL FEES

Application fee, charged each applicant for admission, non-refundable	3.00
Scholarship-application test fee (when required for admission) .....	3.00
Late registration fee, charged each student who fails to register within the designated period .....	5.00
Withdrawal fee, charged each student who preregisters and withdraws prior to the regular registration .....	5.00
Service fee, charged each student for late payment of tuition (see "Payment of Fees") .....	2.00
Reinstatement fee, charged each student who is reinstated after suspension for delinquency in fees .....	5.00
For each examination to qualify for advanced standing and for each special examination .....	5.00

\* This fee does not cover the cost of tuition for undergraduate courses numbered 1 to 200.

† When a student's absence is excused until beyond the time of either the pre-examination period or the examination period to more than one year, the proportionate part of the charge may be paid by the Treasurer.

Laboratory checkout fee, charged each student in chemistry and pharmacy courses who fails to check out of the laboratory by the time set by the instructor .....	3.00
Transcript fee, charged for each transcript of record after the first...	1.00

Registration in the University entitles each student to the following University privileges: (1) the issuance of one certified transcript of record, if and when desired; (2) the services of the Placement Office; (3) the use of the University library facilities, except as otherwise designated; (4) medical attention and hospital services described below. These privileges, with the exception of the issuance of transcripts, cease when the student withdraws or is dismissed from the University.

**Medical and Hospital Services.**—These services include: (1) three visits by the University physician or surgeon, office or residence (District of Columbia) in any one illness, exclusive of a specialist, surgical operation, laboratory, or X-ray examinations; (2) hospitalization, including board and nursing, in the University Hospital for not more than one week during any twelve-month period—the necessity to be determined by the Director of Health Administration. The duration of hospitalization period (maximum, one week) is also to be determined by the Director of Health Administration.

The student is allowed, if he so desires, to engage physicians and nurses of his own choice, but when he does so he will be responsible for the fees charged.

This medical benefit does not apply to illness or disability incurred previous to the University term or prior to payment of tuition fees.

#### PAYMENT OF FEES

All fees are payable at the Office of the Cashier, 725 Twenty-first Street NW. No student is permitted to complete registration or to attend classes until all fees are paid. Fees for each session are due in advance at the time of registration.

An auditor pays all fees chargeable to the student registered for credit except the late-registration fee.

#### WITHDRAWALS AND REFUNDS

Registrations are for the session, and no refunds or rebates are allowed, unless the registration is in advance and the course is dropped before the day of registration for the session involved.

A student who preregisters and withdraws prior to the date of regular registration will be charged a withdrawal fee of \$5.

In no case will tuition be refunded because of nonattendance upon classes.

Payments apply only to the session for which registration charges are incurred, and in no case will these payments be credited to another session or term.

Any student in chemistry or pharmacy who fails to check out of the laboratory on or before the date set by the instructor, unless excused by the instructor, will be charged a laboratory check-out fee of \$3. A student dropping a course before the end of the session must check out of the laboratory at the next scheduled laboratory period.

No permission to withdraw and no certificate for work done will be given a student who has not a clear financial record.

#### UNIVERSITY REGULATIONS

*Students in the Summer Sessions are subject to, and are expected to familiarize themselves with, the University regulations as stated in the general catalogue.*

**Academic Credit.**—The Summer Sessions are an integral part of the University. Academic credit for completed work will be given toward the appropriate degrees in the various colleges and schools of the University in accordance with their separate regulations and requirements.

**Residence.**—Summer Sessions work may be counted in residence but the candidate for a degree must satisfy the residence requirements of the school or college concerned as stated in the general catalogue.

**Amount of Work.**—No full-time student may take more than nine semester hours of work during the eight-week session; no employed student more than six hours.

In the Law School the maximum amount of work that may be taken in both sessions by a full-time student is twelve semester hours; by an employed student, eight semester hours.

The right is reserved to drop any student whenever, in the interest of the student or the University, the Faculty deems it advisable to do so.

The University is not responsible for the loss of personal property belonging to a student.

The University and its various colleges, schools, and divisions reserve the right to modify or change the requirements, rules, and fees of the University. Such regulations shall go into force whenever the proper authorities may determine and shall apply to every student of the University.

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Detailed information concerning curricula; admission; scholarship requirements of the individual colleges, schools, and divisions; and requirements for degrees may be obtained from the general catalogue, which is available on request at the Office of the Director of Admissions.

For information concerning the hours at which courses will be offered,



consult the Schedule of Classes for the Summer Sessions which will be available in May at the office of the Registrar.

#### VETERANS EDUCATION

The George Washington University is approved to provide training for eligible persons under the provisions of Public Laws 346, 16, 550, 894, and 634. The Office of Veterans Education, Building Q, 2029 H Street NW., operates as a service bureau for such persons interested in studying at the University and acts in a liaison capacity between the University and the Veterans Administration. Here information may be obtained concerning the educational program of the University and the procedures for securing educational benefits under the GI and War Orphans bills. Eligible persons will often find it to their advantage to seek advice at the University Office of Veterans Education before applying to the Veterans Administration for a Certificate.

#### PUBLIC LAW 634

##### (War Orphans Educational Assistance Act)

A child of a person who died of a disease or injury incurred or aggravated while on active duty in the Armed Forces during World War I, World War II, or the Korean Conflict may be eligible for educational assistance under this Act, if certain age requirements are met. In the case of a child who has not reached the age of majority, his guardian must make application for him to the Veterans Administration. For further information concerning the benefits available under this Law, consult the University Office of Veterans Education or the Veterans Administration, Munitions Building, Constitution Avenue at Twentieth Street NW., Washington 25, D.C.

#### PUBLIC LAW 346

##### (World War II GI Bill)

The educational benefits for veterans under Public Law 346 terminated July 25, 1956, except as described below.

The Armed Forces Voluntary Recruitment Act of 1945 (Public Law 190) provided that persons enlisting or reenlisting in the Armed Forces between October 6, 1945, and October 5, 1946, may count the entire period of such enlistment or reenlistment as war service for purposes of GI Bill benefits. Such enlistees have four years from the date that enlistment ended to begin training and nine years from that separation date to complete training under this provision.

It is suggested that a veteran having any question regarding his eligibility consult the University Office of Veterans Education or the Veterans Administration, Munitions Building, Constitution Avenue at Twentieth Street NW., Washington 25, D.C.

PUBLIC LAW 550

(KOTCH GI Bill)

In order to be eligible for the benefits under this GI Bill, a veteran must have been in service between June 27, 1950 and January 31, 1955, and must no longer be on active duty. For further information concerning these benefits, consult the University Office of Veterans Education or the Veterans Administration, Munitions Building, Constitution Avenue at Twentieth Street NW., Washington 25, D.C.

At least thirty days prior to registration the veteran wishing to attend under this GI Bill should apply to the Veterans Administration for a Certificate for Education and Training, for presentation to the University Office of Veterans Education at the time of registration. A photostatic copy of his DD214 must accompany the original application for certification.

PUBLIC LAWS 16 AND 894

(Vocational Rehabilitation)

Disabled veterans desiring vocational rehabilitation under either GI Bill should apply to Veterans Administration, Munitions Building, Constitution Avenue at Twentieth Street NW., Washington 25, D.C., for approval of their training objectives at least sixty days prior to registration.

ADMISSION

The entrance requirements for the Junior College, Columbian College, and the School of Government, in other than the preprofessional curricula, have been somewhat modified for veterans who are deficient in the regular requirements for admission, but who have been found by psychological and educational tests able to undertake college work. Veterans who have been enrolled in another educational institution since leaving the service, or who have been out of the service for more than one year prior to the beginning of the semester for which they seek admission, must qualify under the regular admission policies.

Credit for work done in the service schools is granted by the Junior College, Columbian College, the School of Engineering, and the School

of Government provided the veteran has not been out of the service for three years or more. To be considered for such credit veterans should submit to the Director of Admissions photostatic copies of their records indicating courses successfully completed with sufficient identification of the course to enable the Admissions Office to locate it in the Guide to Evaluation of Educational Experience in the Armed Forces.

#### STUDENT LIFE

##### SOCIAL AND RECREATIONAL PROGRAM OF THE UNIVERSITY

The summer social and recreational program includes regularly scheduled social, square, and folk dances on Lisner Terrace. For those who would like instruction and practice in dance, teaching sessions are provided. Get-acquainted teas and a carnival are also included in the program.

During the summer notices of the many recreational and social opportunities offered in the Capital will be posted on a bulletin board in the Student Union.

##### LIVING ACCOMMODATIONS

*Women Students.*—The Hattie M. Strong Residence Hall provides single rooms at \$35 a month and double rooms at \$30 a month a person. Meals are served at the Student Union. Admission to the University does not include dormitory reservation. A separate application for a room should be made well in advance. Forms for application, together with detailed information, may be obtained from the Director of Activities for Women, Woodhull House, 2033 G Street NW.

Girls under the age of twenty-one who are enrolled for six or more credit hours of academic work in the University and who are not living with their parents or relatives may live outside the dormitory only with the permission and approval of the Director of Activities for Women, upon receipt of written requests from parents. In no case will permission be granted for such girls to be domiciled outside the dormitory, except with persons approved by the Director of Activities for Women.

*Men Students.*—Welling Hall provides double room facilities for 102 students. Rooms rent for \$24 a month a person. Meals are served at the Student Union. Application forms for room reservation may be obtained from the Director of Activities for Men, Building Q, 2029 H Street NW.

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Information concerning private rooming and boarding facilities near the University, for women students twenty-one years of age or older and for men students, may be obtained at the Housing Office. The reservation of rooms in private houses must be made by students.



THE COLLEGES, SCHOOLS, AND DIVISIONS



## THE COLLEGES, SCHOOLS, AND DIVISIONS

Information concerning specific requirements for degrees is omitted from this bulletin. For such information, the student is referred to the general catalogue.

### THE JUNIOR COLLEGE

The Junior College includes the first two years of college work. Its curricula are intended to continue the studies of a general cultural nature begun in secondary school, and to lay a foundation for the more specialized work which is to follow.

The Junior College also provides the preprofessional work required for admission to the schools of Pharmacy, Education, and Government, and the first two years of the preprofessional work required for admission to the schools of Medicine and Law.

In addition it provides two-year terminal curricula in Accounting, Home Economics, Medical Technology—Basic Course, Physical Sciences, and Secretarial Studies.

### THE DEGREES

The Junior College offers work leading to the degrees of Associate in Arts and Associate in Science.

### ENTRANCE REQUIREMENTS

An acceptable certificate of graduation from an accredited secondary school is required. The acceptability of the certificate depends upon the student's character and the quality of his work.

### COLUMBIAN COLLEGE

Columbian College, the senior college of liberal arts and sciences, comprises the work of the junior and senior years and the Master of Arts and Master of Science disciplines.

### THE DEGREES

Columbian College offers work leading to the following degrees: Bachelor of Arts, Bachelor of Science, Master of Arts, and Master of Science. In cooperation with the School of Medicine, Columbian College offers work leading to the combined degrees of Bachelor of Arts and Doctor of Medicine.



**UNDERGRADUATE MAJORS**

Curricula leading to the degree of Bachelor of Arts are available in the following major fields:

American Thought and Civilization	Latin American Civilization
Art:	Mathematics
Art History and Theory	Philosophy
Drawing, Painting, Sculpture, and	Physics
Commercial Art	Political Science
Biology	Psychology
Botany	Religion
Chemistry	Sociology
Economics	Spanish American Literature
English Literature	Spanish Literature
French Literature	Speech
Geography	Statistics
Geology	Zoology
Germanic Languages and Literatures	
History	
Journalism:	
News Editorial	
Public Relations	

Curricula leading to the degree of Bachelor of Science are available in the following major fields:

Biology	Physics
Botany	Statistics
Chemistry	Zoology
Geology	
Mathematics	

**GRADUATE FIELDS**

Graduate work leading to the degree of Master of Arts or Master of Science is offered in the following fields:

American Literary and Cultural	Germanic Languages and Literatures
History	History
Anatomy	Latin American Civilization
Bacteriology	Mathematics
Biochemistry	Pharmacology
Biology	Philosophy
Botany	Physics
Chemistry	Physiology
Chemotherapy	Political Science
Economics	Psychology
English and American Literature	Sociology
English Literature	Spanish American Literature
French Literature	Spanish Literature
Geography	Statistics
Geology	Zoology

In addition, programs can be arranged in combined fields subject to the approval of the Committee on Studies.

### ENTRANCE REQUIREMENTS

For the Bachelor's degrees, the degree of Associate in Arts or Associate in Science based on the appropriate curriculum in the Junior College, or the equivalent, is required. Scholarship requirements may be somewhat higher than those for graduation from the Junior College. For the Master's degrees, an approved Bachelor's degree from an accredited institution and a transcript of studies previously pursued, showing appropriate distribution of courses and a superior quality of work in the major field, are required.

### THE GRADUATE COUNCIL

The Graduate Council offers work leading only to the degree of Doctor of Philosophy. Because the basis for work under the Graduate Council is primarily creative research, regular study in specific courses is considered quite incidental and is therefore not emphasized in connection with the curricula of the Summer Sessions. A student wishing to work under the disciplines of the Graduate Council will consult the Chairman of the Graduate Council for information concerning credentials and candidacy.

A pamphlet describing details of the Graduate Council program, together with a current list of fields of research offered by the Council, will be sent upon request to the Office of the Graduate Council.

### THE LAW SCHOOL

The Law School offers work leading to the following degrees: Bachelor of Laws, Juris Doctor, Master of Laws, Master of Comparative Law, and Doctor of Juridical Science.

See "Registration," on page 18 for provisions applicable to students who plan to take the New York Bar examination.

### ENTRANCE REQUIREMENTS

*For the Degree of Bachelor of Laws.*—A Bachelor's degree awarded upon completion of a four-year course in an approved college or university is required. All pre-legal work must be of a satisfactory quality and distribution. No student will be admitted who has been in attendance at another law school and who is ineligible to return to that school in

good standing. From the applicants, a selection will be made by the Committee on Admissions.

**The Juris Doctor degree** is conferred as a recognition of completion with high rank of the full course, including experience in research and legal authorship. A student does not register as a candidate for this degree until his last year in the Law School.

**For the Degree of Master of Laws.**—A Bachelor of Arts or equivalent degree from an approved college or university and a Bachelor of Laws or equivalent degree from a member school of the Association of American Law Schools are required. Candidates for admission must have attained an average grade on all work done for the Bachelor of Laws degree equivalent to the relative position of a *B* average in the standards of grading at this Law School, except that, in the discretion of the Committee on Graduate Studies, applicants otherwise eligible may be admitted on proof of experience and attainment as an alternative.

**For the Degree of Master of Comparative Law.**—The following are required: (1) the successful completion of and graduation from a course in arts, philosophy, letters, or sciences, equivalent to graduation from a gymnasium, lycee, or lyceo (junior college); and (2) graduation in law from a recognized foreign university where training was in civil law.

**For the Degree of Doctor of Juridical Science.**—The following are required: (1) the degree of Juris Doctor from this Law School; or (2) the degree of Bachelor of Arts from an approved college, the degree of Bachelor of Laws or the equivalent, earned with high rank, from a member school of the Association of American Law Schools, and outstanding capacity for scholarly work in the field of law.

**Unclassified Students.**—A person who is in good standing as a degree candidate in another law school which is a member of the Association of American Law Schools may, at the discretion of the Dean, be admitted as an unclassified student in order to earn credits for transfer to the other law school.

A person who is a member of the bar or a person, not a member of the bar, who is a graduate of a member school of the Association of American Law Schools may, at the discretion of the Dean, be admitted as an unclassified student.

Unclassified students are required to participate in the work of the course and take examinations. Courses taken by unclassified students will not be credited toward degrees at this Law School.

**Continuing Legal Education Students.**—A simplified admission and registration procedure is provided for members of the bar desiring to register as continuing legal education students to take courses on a non-credit basis. Members of the bar desiring to register as degree candidates or as unclassified students should file the regular application for admission form.



## THE SCHOOL OF ENGINEERING

The School of Engineering offers courses leading to the degrees of Bachelor of Civil Engineering, Bachelor of Electrical Engineering, Bachelor of Mechanical Engineering, Bachelor of Science in Engineering, Master of Science in Engineering, and Master of Engineering Administration. It also directs work leading to the professional degrees in the fields of civil, electrical, and mechanical engineering.

## ENTRANCE REQUIREMENTS

## For the Bachelor's Degrees

*Bachelor of Civil Engineering, Bachelor of Electrical Engineering, Bachelor of Mechanical Engineering, Bachelor of Science in Engineering.*—An acceptable certificate of graduation from an accredited secondary school, or the satisfactory passing of College Entrance Board examinations in secondary school subjects selected with the approval of the Director of Admissions is required.

Nine and one-half of the fifteen units required for entrance must be distributed as follows: three in English, two in algebra, one in plane geometry, one-half in plane trigonometry, one in physics or chemistry, and two in one foreign language or history. A graduate of an approved high school who does not offer for admission the particular subjects required for the engineering curriculum, but who does present not less than fifteen acceptable units, may be admitted on condition, if such deficiency in the distribution of units does not exceed two units.

Advanced standing may be granted for work successfully completed at accredited institutions of higher learning. Credit will be assigned by the School of Engineering to the extent that the work taken at previous institutions meets the requirements for the degree sought at this University, and subject to the general University regulations concerning satisfactory subsequent work.

## THE SCHOOL OF PHARMACY

The School of Pharmacy offers work leading to the degree of Bachelor of Science in Pharmacy.

## ENTRANCE REQUIREMENTS

An Associate in Arts degree based on the curriculum in Pharmacy in the Junior College, or the equivalent, is required.

## THE SCHOOL OF EDUCATION

The School of Education prepares teachers, supervisors, and administrators for educational service and offers opportunities to teachers of experience to extend their education. The schedule of courses is arranged to meet the needs of employed students as well as those able to devote full time to their studies. It offers both graduate and undergraduate work.

## THE DEGREES

The School of Education offers work leading to the following degrees: Bachelor of Arts in Education, Bachelor of Science in Home Economics, Bachelor of Science in Physical Education, Master of Arts in Education, and Doctor of Education.

## ENTRANCE REQUIREMENTS

*For the Bachelor's Degrees.*—The satisfactory completion of two years of approved college work, or graduation from an approved two-year normal school, or the equivalent, is required.

*For the Master's Degree.*—A Bachelor's degree from an accredited college, or the equivalent, and the approval of the Committee on Admission and Advanced Standing are required.

*For the Doctor's Degree.*—A Master's degree from an accredited college, or the equivalent, and the approval of the Faculty of the School of Education are required.

## THE SCHOOL OF GOVERNMENT

## THE DEGREES

The School of Government offers work leading to the following degrees: (1) Bachelor of Arts in Government with a major in Foreign Affairs, Accounting, Business Administration, or Business and Economic Statistics; (2) Master of Arts in Government with a major field in Foreign Affairs, Economic Policy, Accounting, Business and Economic Statistics, Counseling, or Psychometrics; (3) Master of Arts in Public Administration; (4) Master of Arts in Personnel Administration; (5) Master of Business Administration; (6) Doctor of Business Administration.

## ENTRANCE REQUIREMENTS

## For the Bachelor's Degree

*Bachelor of Arts in Government.*—An Associate in Arts degree based on the *Foreign Affairs, Accounting, Business Administration, or Statistics* curriculum in the Junior College, or the equivalent, and a quality-point index of 2.00 for the first two years' work are required.

## For the Master's Degrees

A Bachelor's degree from an accredited college or university is required. A student from an unaccredited institution may be admitted at the discretion of the Dean's Council, but will be required to take such extra work above the minimum requirements as may be prescribed.

Students admitted to candidacy must have attained a quality-point index of 3.00 (a *B* average) in their undergraduate major. An applicant whose scholastic average is below 3.00 in his major, or who lacks prerequisite courses, may be referred to the Division of Special Students to make up the deficiency.

*Master of Arts in Government.*—The applicant's undergraduate program must have included prerequisite courses, corresponding to an undergraduate major at this University, for the chosen field of graduate study.

*Master of Arts in Public Administration.*—An undergraduate major in a social science field appropriate to the chosen field of advanced work in public administration is required.

*Master of Arts in Personnel Administration.*—An undergraduate major in a social science or education, with the appropriate courses in psychology is required.

*Master of Business Administration.*—An acceptable undergraduate major in Business Administration or the equivalent is required. Applicants who are deficient in such course work may be admitted and will be required to make up deficiencies over and above the normal Master of Business Administration program.

## For the Degree of Doctor of Business Administration

A Master's degree in Business Administration or a related field, or the equivalent, and proficiency in Statistics and Accounting to the satisfaction of the Committee on Doctoral Studies are required.







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GEORGE WASHINGTON UNIVERSITY  
INVITES YOU TO STUDY THIS SUMMER IN THE  
NATION'S CAPITAL







The architectural designs of the Hall of Government and Jones Memorial Hall are part of the master plan from the Army Engineers Commission of the postwar side from the University of Georgia.



The beautiful Blue Ridge Mountains of Virginia and the famous Maryland beaches are only an hour's drive from the George Washington campus at the heart of the Nation's Capital.









The Society includes, as The George Washington University, having students from all over the United States, all the Nation's Capital, as attend, will events in the various centers of the National Symphony Orchestra, and to participate in the Summer Session program.



*You will never forget your summer of study at  
the campus just blocks from the White House*





## COURSES OF INSTRUCTION

### EXPLANATION OF COURSE NUMBERS

*First-group courses.*—Courses numbered from 1 to 100 are planned for the student in the freshman or sophomore year. With the approval of the adviser and the dean, they may also be taken by a junior or senior. In certain instances, they may be taken by a graduate student to make up undergraduate deficiencies or as prerequisite to advanced courses, but they may not be credited toward a higher degree.

*Second-group courses.*—Courses numbered from 101 to 200 are planned for the student in the junior or senior year. They may be credited toward higher degrees only when registration for graduate credit has been approved at the beginning of the course by the dean responsible for the graduate work and by the officer of instruction, and when the completion of additional work has been certified by the officer of instruction.

*Third-group courses.*—Courses numbered from 201 to 300 are planned primarily for the graduate student. They are open, with the approval of the officer of instruction, to the qualified senior; they are not open to the Junior College student.

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In the Law School, first-year courses are numbered from 100 to 200; second-year courses, from 201 to 300; third-year courses, from 301 to 400; and graduate courses, from 401 to 500.

### INDICATION OF THE AMOUNT OF CREDIT

The number of hours of credit given for the satisfactory completion of a course is in most cases indicated in parentheses after the name of the course.

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For information concerning the hours at which courses will be offered, consult the Schedule of Classes for the Summer Sessions which will be available in May at the office of the Registrar.

The University reserves the right to change or withdraw any of the courses of instruction listed.

### ACCOUNTING

#### 1 *Introductory Accounting* (3)

Basic principles underlying accounting records used by single proprietorships; preparation of the work sheet and financial statements. Morning.

Kennedy

- 1-2 *Introductory Accounting* (3-3) Benson  
Basic principles underlying accounting records used by single proprietorships, partnerships, and corporations; preparation of the work sheet and financial statements; introduction to cost accounting; analysis of financial statements; valuation and income determination problems. Prerequisite to Accounting 2: Accounting 1 or permission of the instructor. Accounting 2 begins July 15. Evening.
- 101 *Cost Accounting* (3) Kurtz  
Theory and practice of industrial cost accounting; treatment of the systems of cost control and determination; the analysis and interpretation of cost data. Emphasis will be on job order cost accounting. Prerequisite: Accounting 1-2. Morning.
- 111 *Financial Statement Analysis* (3) Kennedy  
Methods and techniques of preparing, analyzing, and interpreting financial statements for the guidance of operating executives, directors, stockholders, and creditors; determination and interpretation of trends and ratios. Prerequisite: Accounting 1-2. Morning.
- 132 *Accounting Theory* (3) Kurtz  
Development of basic accounting principles and concepts with special reference to the current thought expressed by the American Institute of Accountants and the American Accounting Association. Prerequisite: 6 hours of accounting. Evening.
- 171 *Auditing* (3) Kurtz  
Duties and responsibilities of auditors; principles and procedures of making audits; techniques of verifying each financial statement item; preparation of audit working papers and reports. Prerequisite: Accounting 121-22 or permission of the instructor. Evening.
- 193 *Business Budgeting* (3) Benson  
Principles, techniques, and procedures involved in the development, installation, and operation of a system of budgetary control to aid in the management of commercial and industrial organization. Prerequisite: Accounting 1-2. Evening.
- 212 *Managerial Accounting* (3) Kennedy  
Principles underlying the accounting system with special reference to the use of financial and operating records as a tool of management; emphasis on managerial control, accounting control, accounting reports, and the use of budgets and cost data in planning and controlling the business. Prerequisite: 6 hours of accounting or the permission of the instructor. Evening.
- 2007 1-00 *Topics* (3-3) The Staff

## ART

- 11 *Art Appreciation* (3) Leite  
A consideration of the vocabulary, methods, and materials of creative expression in the fine arts. A study of the literature and history of art in its various media; the development of artistic aesthetic principles, theories, and styles in art through the ages. Morning.

- 71 *Introduction to the Arts in America* (3) Kline  
Painting, sculpture, architecture, furniture, and the popular arts during the Colonial and Republican periods. Evening.
- 72 *Introduction to the Arts in America* (3) Kline  
Painting, sculpture, architecture, furniture, and the popular arts during the mid-19th and 20th centuries. Afternoon.
- 108 *Baroque Art in Italy* (3) Leite  
The development of painting, sculpture, and architecture in the 16th and 17th centuries in Italy. Morning.

## BIOLOGY

- 1-2 *Survey in Biology* (3-3) Bowman, Munson  
Systematic study of the plant and animal kingdoms, with emphasis upon the interdependence of living things and their relations with their environments. Introduction to organic evolution, heredity, public health, and conservation. Material fee, \$7 for each half. Nine-week term. Biology 1 is not prerequisite to Biology 2. Biology 2 begins July 18 and ends August 10. Lectures, laboratories, and field trips. Afternoon.
- 212 *Research in Cytology* (arr.) Bowman  
Individual problems for advanced students interested in this field. Hours and credits to be arranged.
- 299-300 *Thesis* (3-3) Bowman

## BOTANY

- 1 *Structure and Functions of the Flowering Plant* (3) Palmer  
The typical plant as a working mechanism, with emphasis on biological significance of plant physiology. Material fee, \$7. Lecture and laboratory—morning.
- 2 *Survey of the Plant Kingdom* (3) Palmer  
Study of the different kinds of plants, with emphasis on the evolution of the plant kingdom; practice in identifying flowering plants. May be taken concurrently with Botany 1. Material fee, \$7. Lecture and laboratory—morning.
- 295 *Research* (arr.) The Staff  
Time, credits, and fees to be arranged.
- 299-300 *Thesis* (3-3) The Staff

## BUSINESS AND PUBLIC ADMINISTRATION

## BUSINESS ADMINISTRATION

- 1-1 *Business Organization and Combination* (3) Timberlake  
Single and interrelated terms of business enterprise and their control by government. Morning.



- 102 *Business Management* (3) Towson  
The management movement, organization of an enterprise, principles of management and their application to various departments of an enterprise. Morning.
- 105 *Personnel Management in Industry* (3) Stonesifer  
Organization and work of the personnel department, human relations in business. Evening.
- 109 *Office Management* (3)  
Organization and layout of an office, use of office machines and appliances, planning and execution of work, supervision problems. Evening.
- 131 *Business Finance* (3) Timberlake  
Basic principles involved in the financing of business enterprises. Prerequisite: Accounting 1-2. Morning.
- 138 *Investments* (3) Shaffner  
Analysis of factors of investment credit with application to different types of investments, proper selection of investments for various classes of investors, taxation. Prerequisite: Accounting 1-2. Evening.
- 141 *Principles of Marketing* (3) Towson  
A survey of marketing, giving particular attention to consumption, retailing, wholesaling, and sales management; the entire marketing structure and its relation to the total economy. Prerequisite: Economics 1-2. Morning.
- 232 *Seminar in Business Finance* (3) Dockeray  
Research in advanced financial problems. Evening.
- 292 *Seminar in Business Management* (3) Dockeray  
Research on various phases of management, including business, industrial, and personnel management. Evening.
- 299-300 *Thesis* (3-3) Dockeray and Staff

## PUBLIC ADMINISTRATION

- 211 *Problems of Governmental Organization* (3) Obern  
Theories and principles of organization; analysis of problem areas in administration, such as decentralization, staff-line, field-headquarters, and executive-legislative relationships. Evening.
- 212 *Case Studies in Administration* (3) Obern  
Analysis and discussion of problems in public management, approached by the group using primarily the case method. Evening.
- 271 *Reading and Conference Course in Public Management and Administration* (3) Brown  
The purpose of this course is to provide advanced students with directed reading in specific areas of public management and administration. Time to be arranged.

## CHEMISTRY

- 11-12 *General Chemistry\** (4-4) Harkness, ———  
 Elementary course in general chemistry. Prerequisite: one year of high school science. Students who credit for one semester of general chemistry (college level) may enter Chemistry 12 on July 18. Laboratory fee, \$18 for each half. Nine-week term ending August 19. Morning.
- 21 *Qualitative Inorganic Analysis* (4) Vincent  
 Theoretical and practical study of methods of separating and identifying the more common cations and anions using systematic techniques. Prerequisite: Chemistry 12. Laboratory fee, \$18. Eight-week term. Afternoon.
- 22 *Quantitative Inorganic Analysis I* (4) Schmidt  
 Theory and practice of quantitative analysis by typical volumetric and gravimetric procedures. Prerequisite: Chemistry 21. Laboratory fee, \$18. Eight-week term. Afternoon.
- 151-52 *Organic Chemistry\** (4-4) Wrenn, ———  
 Chemistry of the 100+ kinds of carbon. Prerequisite: Chemistry 21. Chemistry 151 laboratory fee, \$111; Chemistry 152 laboratory fee, \$18. Students who have credit for Chemistry 151 may enter Chemistry 152 on July 18. Nine-week term ending August 19. Morning.
- 295-96 *Research* (arr.) The Staff  
 Research on problems approved by the Staff. Open to qualified students with advanced training. Laboratory fee, \$7.50 a semester hour. Hours and credits to be arranged.
- 299-300 *Thesis* (3-3) The Staff  
 Laboratory fee, \$18 each half. Hours to be arranged.

## ECONOMICS†

- 1 *Principles of Economics*‡ (3) Burns, ———  
 Survey of the major economic principles, institutions, and problems in contemporary life. Morning and evening.
- 2 *Principles of Economics* (3) Watson, ———  
 Continuation of Economics 1. Prerequisite: Economics 1. Morning and evening.
- 101 *Economic Analysis* (3) Watson  
 Analysis of demand, supply, and commodity pricing; theory of national income determination; pricing of productive services; welfare economics. Morning.
- 102 *Economic Analysis* (3) ———  
 Continuation of Economics 101. Prerequisite: Economics 101. Evening.

\* Full-year course; credit is not given until the second half of course is completed.

† Economics 1-2 is prerequisite to all other half courses in Economics.

- 121 *Money and Banking* (3) Schmidt  
Theory of money, credit, and banking; commercial banking and the Federal Reserve System; other financial institutions; international aspects of money; current financial problems. Afternoon.
- 181 *International Economics* (3) Schmidt  
Survey of world economies; theories of international trade; analysis of international economic problems, and the international organizations. Morning.
- 213 *Economic Thought in the Twentieth Century* (3) Burns  
The principal trends in economic thought during the present century. Evening.
- 219 *Managerial Economics* (3) Watson  
Analysis of price, production, and inventory policies of business firms. Evening.
- 251 *Theories of Economic Development* (3) Schmidt  
Growth and change in economic activity, capital accumulation, innovations in technology and business organization. Evening.
- 299-300 *Thesis* (3-3) The Staff

## EDUCATION

## PRE SESSION

June 10 to June 28

- 109 *Learning and Teaching* (3) McCauley  
For the general student as well as the prospective teacher. Nature of learning based on the study of human growth and development and the observation of classroom situations. Lectures, small group discussions, conferences, and field work: June 10 through June 14—evening; after June 14—morning and afternoon.
- 120 *Elementary School Arithmetic* (3) St. Cyr  
For teachers. Content, methods, materials, and activities essential to a good program. Prerequisite: Education 109-10 and 121-22, or teaching experience. Lectures, small group discussions, conferences and field work: June 10 through June 14—evening; after June 14—morning and afternoon.
- 219 *Elementary School Classroom Procedures\** (3) LaBue  
Current classroom practices with particular emphasis on ways of planning, unit teaching, techniques in discipline, individual and group evaluation techniques, resources for learning, provision for individual differences. Lectures, small group discussions, and field work. June 10 through June 14—evening; after June 14—morning and afternoon.

\* Prerequisite: adequate professional preparation.



- 231 *Secondary School Classroom Procedures\** (3) Bish  
Survey of current classroom practices with particular attention to selected topics such as teacher-cupil planning, group procedures, pupil security, initiatory and culminating activities, individual and group evaluation techniques, teaching aids, etc.; review of recent literature. Lectures, conferences, small group discussions, and field work; June 15 through June 14—evening; after June 14—morning and afternoon.

## TWELVE-WEEK EVENING SESSION

First Half—June 10 to July 19

- 109 *Learning and Teaching* (3) Detwiler  
For the general student as well as the prospective teacher. Nature of learning based on the study of human growth and development and the observation of classroom situations. Evening.

Second Half—July 22 to August 30

- 110 *Learning and Teaching* (3) Detwiler  
For the general student as well as the prospective teacher. Nature of teaching approached through the understanding of learning and the observation of classroom situations. Evening.

## SPECIAL SIX-WEEK SESSION

First Half—July 1 to July 19

- 110 *Learning and Teaching* (3) McCauley  
For the general student as well as the prospective teacher. Nature of teaching approached through the understanding of learning and the observation of classroom situations. Lecture—morning, small group discussions, conferences, and field work—afternoon.

- 116 *Elementary School Social Studies* (3) LaBue  
For teachers. Content, methods, materials, and activities. Prospective teachers 102-10 and 110-11 of teaching experience. Lecture—morning, small group discussions, conferences, and field work—afternoon.

- 207 *Curriculum Materials\** (3) Bish  
For experienced teachers. Construction of survey of study, resource units, classroom teaching aids, and supplementary materials; direct application to teacher's own situation. Lecture and conference—morning; small group discussions and field work—afternoon.

- 255 *Secondary Education\** (3) Root  
Current programs for the improvement of secondary education. Lecture and conference—morning; small group discussions and field work—afternoon.

\* These courses require previous professional preparation.

## Second Half—July 22 to August 9

- 113 *Elementary School Art* (3) Crump  
Content, materials, and methods essential to a good program. Prerequisite: Psychology 1 and 2. Material fee, \$4.50. Lecture—morning; small group discussions, laboratory, and field work—afternoon.
- 121 *Society and the School* (3) Angel  
Historical and sociological developments as related to social, national, and international roles of education; cooperation of the school with other community agencies. Lecture—morning; small group discussions, conferences, and field work—afternoon.
- 225 *Elementary School Reading* (3) Coleman  
Developmental and remedial approaches to reading problems. Demonstrations of diagnostic and corrective techniques used in the Reading Clinic. Lecture and conference—morning; small group discussions and field work—afternoon.
- 250 *Secondary Education\** (3) Ryan  
Current problems in each of the sub-branches of the field. Lecture and conference—morning; small group discussions and field work—afternoon.

## Full Period—July 1 to August 9

- 210 *Adolescent Growth and Development* (3) LaBue  
A consideration of physical, intellectual, and cultural backgrounds of adolescence with particular emphasis on social development; adjustment to adolescent society; educational development; and adjustment to the school and the home. Evening.
- 216 *Education of the Slow Learner\** (3)  
Identification, nature, and needs of the slow learner at the elementary and junior high school levels. Emphasis upon methods of selection devised for regular classroom teachers who must employ special methods and materials in the education and training of the slow learner. Also of interest to specialclass teachers and administrators. Afternoon.
- 217 *Contemporary Problems in Education\** (3) Jacobson  
Designed to help students formulate a personal philosophy of education. Morning.
- 229 *Administration of Elementary Education* (3) Merriam  
For experienced teachers and administrators. Administration as a means of attaining instructional objectives, supervising learning and teaching activities, handling money and equipment, maintaining the building, and integrating school and community life. Emphasis upon guide lines to action. Afternoon.

\*For graduate, adequate professional preparation.

- 241 *Education of the Gifted\** (3) Indent  
For classroom teachers. Nature and discovery of giftedness; provisions for the gifted in regular classes; experimental projects. Evening.
- 243 *Human Relations in the Classroom\** (3) Marinaccio  
Principles and practices involved in interpersonal relationships between learner and teacher and among learners. Evening.
- 251 *Guidance in Secondary Schools\** (3) Brougher  
Superior study organization of the guidance section to improve the instructional staff, and the administrative personnel needed for the program. Morning.
- 272 *The Teacher and School Supervision\** (3) Fox  
Nature, organization, human relationships, and techniques. Morning and afternoon.
- 279 *Adult Education\** (3) Koenigler  
Current concepts and objectives, materials involved, programs on all levels—interrelated through community. Evening.
- 281 *Group Procedures in Education\** (3) Detwiler  
Theory, practice, evaluation, and application to all educational levels. Morning.
- 295 *Educational Research Methods and Procedures* (3) Fox  
Required of all Master's candidates following Plan 2. Afternoon.
- 297 *Reading in Education* The Staff  
To assist those preparing for the comprehensive examination. No credit toward degree requirements. Tuition fee \$17. Afternoon.

PORT SESSION

August 14 to August 16

- 122 *Society and the School* (1) St. Cyr  
For the general student as well as the prospective teacher. Organization and operation of schools; curriculum and functions; role of the teacher. Lectures—morning; study group discussions, understandings, and field work—afternoon.
- 212 *Evaluation in Education\** (1) McCauley  
Concepts of evaluation, philosophy, learning, evaluation of individuals and groups, steps involved in the construction of learning outcomes. As the course progresses and student develops interest, his evaluation problems related to his work situation. Lectures—morning; study group discussions, understandings, and field work—afternoon.

\*All students require pre-approved preparation.



## ENGINEERING

## CIVIL ENGINEERING

22 *Analytical Mechanics: Dynamics* (3)

Kinetic friction; simple kinematics; translation, rotation, and plane motion of rigid bodies; work; energy; power; impulse; momentum; impact; simple vibrations. **Prerequisite:** Civil Engineering 21 *Statics* or the equivalent; Mathematics 20 *Integral Calculus*. Evening.

## ELECTRICAL ENGINEERING

12 *Electric Machinery* (3)

Principles of electromechanical energy conversion; methods of machine analysis; theories of D-C and synchronous machines. **Prerequisite:** Electrical Engineering 11 *Fundamentals of Electrical Engineering* or the equivalent. Evening.

## MECHANICAL ENGINEERING

6 *Engineering Problems* (2)

Simple engineering problems in statics, dynamics, energy, heat, and electricity. Training in reasoning, engineering analysis, and application of mathematics to engineering problems. **Prerequisite:** Mechanical Engineering 5 *Orientation and Engineering Problems* or the equivalent; removal of all entrance deficiencies in science or mathematics. Evening.

## ENGLISH

## ENGLISH COMPOSITION \*

A *English Practice* (3)

Moore and Stull

Instruction, drill, and exercises in grammar, vocabulary, spelling, and mechanics in general; instruction and exercises in composition and writing. This course is designed to prepare students for English 1. Morning and evening.

B *English for Foreign Students* (3)

Allee

A course in reading and writing designed to prepare the student for English 1. Special attention is given to spelling, syntax, grammar, idiom, and vocabulary. Evening.

\* Before students are registered in English 1, they are tested in the minimum essentials of reading, spelling, grammar, standard usage, and writing skills. Those students who show marked superiority may, upon passing further tests, be exempted from one or both halves of the English Composition course; those who are inadequately prepared for English 1 will be assigned to English A.

All pre-College and College students who are required to take one year of English composition and one year of literature in English, Classical Languages, French, German, or Spanish will follow the sequence of English 1, both halves of one of the advanced literature courses, and English 4. English 2 is the second half of the six-hour composition course composed of students not following the pre-College and College programs.

English 3 is prescribed for all other programs in English.

- 1 *English Composition*\* (3) Moore and Staff  
Review of grammar, exercises in composition, readings. Morning and evening.
- 2 *English Composition*\* (3) Moore and Staff  
Continuation of English 1. Morning and evening.
- 4 *English Composition*\* (3) Moore and Staff  
A course in critical analysis and practice of expository and argumentative techniques and in research procedure. This is the second half of the summer composition course required of students in the pre-Columbian College curricula. Prerequisite: English 1 and both halves of an introductory literature course. Morning and evening.
- 11 *The Writing of Reports* (3) Turner and Staff  
Theory and practice in the writing of technical reports. Morning and evening.

## ENGLISH LITERATURE\*

- 51 *Introduction to English Literature* (3) Shepard and Staff  
A historical survey. From beginnings to 1800. Morning and evening.
- 52 *Introduction to English Literature* (3) Shepard and Staff  
A historical survey. Literature since 1800. Morning and evening.
- 130 *Shakespeare* (3) Linton  
The tragedies. Morning.
- 102 *Victorian Literature* (3) Shepard  
Poetry from 1830 to 1900. Morning.
- 183 *The English Drama* (3) Highfill  
The course is concerned principally with the drama of Shakespeare's contemporaries. Morning.
- 192 *Medieval Legend and Saga* (3) Allee  
Celtic and Norse. Evening.
- 236 *Studies in Shakespeare and His Contemporaries* (3) Tupper  
Prerequisite: English 115-3. Evening.
- 249 *Studies in Twentieth Century Literature* (3) Linton  
Recent trends in British poetry and criticism. Evening.

\* All pre-Columbian College students must be required to take one year of English composition and one year of literature in English, German, Japanese, French, Latvian, or Russian, and follow the sequence of English 1, both halves of the introductory literature course, and English 4.

\* English 115-2, 115-3, 115-4, 115-5, 115-6, 115-7, 115-8, 115-9, 115-10, 115-11, 115-12, 115-13, 115-14, 115-15, 115-16, 115-17, 115-18, 115-19, 115-20, 115-21, 115-22, 115-23, 115-24, 115-25, 115-26, 115-27, 115-28, 115-29, 115-30, 115-31, 115-32, 115-33, 115-34, 115-35, 115-36, 115-37, 115-38, 115-39, 115-40, 115-41, 115-42, 115-43, 115-44, 115-45, 115-46, 115-47, 115-48, 115-49, 115-50, 115-51, 115-52, 115-53, 115-54, 115-55, 115-56, 115-57, 115-58, 115-59, 115-60, 115-61, 115-62, 115-63, 115-64, 115-65, 115-66, 115-67, 115-68, 115-69, 115-70, 115-71, 115-72, 115-73, 115-74, 115-75, 115-76, 115-77, 115-78, 115-79, 115-80, 115-81, 115-82, 115-83, 115-84, 115-85, 115-86, 115-87, 115-88, 115-89, 115-90, 115-91, 115-92, 115-93, 115-94, 115-95, 115-96, 115-97, 115-98, 115-99, 115-100, 115-101, 115-102, 115-103, 115-104, 115-105, 115-106, 115-107, 115-108, 115-109, 115-110, 115-111, 115-112, 115-113, 115-114, 115-115, 115-116, 115-117, 115-118, 115-119, 115-120, 115-121, 115-122, 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## AMERICAN LITERATURE \*

- 71 *Introduction to American Literature* (3) Bolwell and Staff  
A historical survey. From beginnings to 1865. Morning and evening.
- 72 *Introduction to American Literature* (3) Bolwell and Staff  
A historical survey. Literature since 1865. Morning and evening.
- 170 *The American Short Story* (3) Coberly  
The historical development of the short story in America. Evening.
- 176 *American Drama* (3) Bolwell  
Historical and critical study of significant plays and forms in the twentieth century. Morning.
- 178 *American Fiction* (3) Coberly  
Historical and critical study of significant novels since 1920. Evening.

## GEOGRAPHY

- 51 *Introduction to Geography* (3) Murphy  
A study of place, environment, and relationships; patterns and associations of physical and cultural earth features. Morning.
- 52 *World Regions* (3) Westernmann  
The analysis of world regional divisions; description and interpretation of physical-cultural complexes; evaluation of regional differences as they affect the distribution and activities of man. Evening.
- 171 *Field Geography* (3) Westernmann  
Field study methods; training in mapping and analysis techniques for both rural and urban areas. Prerequisite: Geography 51 and 52. Transportation fee, \$18. Saturday morning and afternoon.
- 174 *Map Interpretation* (3) Murphy  
Map elements and uses, map reading, interpretation and evaluation of maps. Prerequisite: Geography 1-3-4. Evening.
- 221 *Seminar: Military Geography* (3) Campbell  
Evening.

## GERMAN

- 1-2 *First-year German* (3-3) Reuter, Klier  
The essentials of German grammar; translation of easy prose. Full-year course; credit is not given for German 1 until German 2 is completed. Second half begins July 15. Morning and evening.
- 3-4 *Second-year German* (3-3) The Staff  
Selecting from modern German prose, review of grammar. Full-year course; credit is not given for German 3 until German 4 is completed. Prerequisite: German 1-2 or two years of high school German. Second half begins July 15. Morning and evening.

\* See footnote on page 47.



- 49 *German Readings for Non-major Students* (3) Legner  
 Designed primarily for graduate students preparing for reading examinations. Undergraduates admitted with the permission of the instructor. No academic credit for graduate students. June 17 to July 15. Evening.

## HISTORY\*

- 39 *The Development of European Civilization* (3) Kayser  
 Primarily for freshmen. The political, social, economic, and cultural history of the Old World from ancient times to 1715. Morning.
- 40 *The Development of European Civilization* (3) Thompson  
 Primarily for freshmen. The political, social, economic, and cultural history of the Old World from 1715 to the present. Evening.
- 71 *The Development of the Civilization of the United States* (3) Koenig  
 Primarily for sophomores. The political, social, economic, and cultural forces of the United States in their world setting from 1492 to 1895. Morning.
- 72 *The Development of the Civilization of the United States* (3) Haslett  
 Primarily for sophomores. The political, social, economic, and cultural forces of the United States in their world setting from 1895 to the present. Evening.
- 130 *Nationalism* (3) Kayser  
 The historical evolution of modern Nationalism. Morning.
- 144 *Modern Germany* (3) Thompson  
 German politics and culture as a driving force in the modern world, 1741-1945. Morning.
- 161 *Ancient Americans* (3) Davis  
 A study of the Maya, Aztec, Incas and the other early civilizations of North and South America. Evening.
- 171 *Social History of the United States* (3) Gray  
 Daily life, institutions, intellectual and artistic achievements of the Agrarian Era, 1607-1891. Morning.
- 173 *Representative Americans* (3) Gray  
 A biographical approach to national history. Some fifty significant and pivotal personalities in the development of the United States in government, business, science, religion, journalism, the arts, and social reform. Morning.

\* History 101 is a prerequisite to courses 102 through 104 and 105 through 107. History 111, 121, to courses 154 through 181.

- 176 *Political and Constitutional History of the United States* (3) Haskett  
The programs and conflicts of group interests in America within the political and legal framework: the Civil War to 1945. Evening.
- 182 *Diplomatic History of the United States since 1871* (3) Merriman  
Tendencies toward isolation, expansion, and collectivism; disputes with foreign countries and their settlement; and the activities of the American secretaries of state and diplomatic agents. Morning.
- 183 *Oversea Expansion of the United States* (3) Merriman  
The political, economic, social, and cultural life of our outlying possessions. Morning.
- 199-200 *Proseminar: the Literature and Method of History* (3-3) The Staff  
Limited to majors in History. Hours to be arranged.
- 291-92 *Seminar* (3-3) The Staff  
Prerequisite: approval of the Department. Hours to be arranged.
- 299-300 *Thesis* (3-3) The Staff  
Required of all candidates for the Master's degree specializing in history. Hours to be arranged.

## LAW

## FIRST SESSION

June 10 to July 23

- 115 *Contracts I* (4) Dixon  
Material about offer and acceptance, consideration, proof, evidence rules. Statute of Frauds, third party beneficiaries, assignments, conditions. Evening.
- 135 *Legal Method and Legal System* (4) Merrifield  
Introduction to substantive and procedural law dealing with basic concepts; training in method and technique of case law and legislation using modern case records; practice in use of law books and in legal writing; comparison of law systems in law; legal reasoning and use of precedents under doctrines of stare decisis, law of the case, and res judicata; development of Anglo-American legal system; organization of judiciary and bar, stressing enforcement of ethical standards. Evening.
- 145 *Personal Property* (2) Mallison  
Concepts of property, including interests created by bailments, liens, and pledges; methods of acquiring ownership. Morning and evening.

- 200 *Administrative Law* (4) Davison  
The position of the administrative process in the separation of powers, including the status of administrative personnel, administrative hearings, judicial scrutiny of administrative action, discretion, and rule-making—particularly as relating to federal administrative agencies. Evening.
- 215 *Civil Procedure* (4) Burke, Walburn  
Pleadings, discovery, joinder, forms of trial and related proof problems. Emphasis is on Federal Rules of Civil Procedure and other modern codes. Morning and evening.
- 270 *Legislation* (2) Mallison  
The legislative process, with particular emphasis on its operation in the federal and state governments; legislative organization and procedure; kinds of statutes; statutory interpretation. Morning.
- 309 *Conflict of Laws* (4)  
Study of cases involving foreign elements; principles of jurisdiction and limitations upon its exercise; procedure, torts, workmen's compensation, contracts, property, family law, administration of estates, business associations. Morning.
- 355 *Mortgages* (2) Orentlicher  
Security interests in real property, their creation, transfer, enforcement, and extinguishment. Evening.
- 380 *Suretyship* (2) Orentlicher  
The law of suretyship, especially in the context of accommodation credit and commercial and financial practices, with attention also to internal and non-consensual suretyship relations and the place of suretyship principle in the solution of legal problems generally. Evening.

## SECOND SESSION

July 25 to September 7

- 110 *Contracts II* (2) Mayo  
Scope of protection afforded contracts; specific performance of contracts other than land transactions. Evening.
- 125 *Criminal Law and Procedure* (4) Cooper  
Origin and purposes of criminal law, elements of criminal liability; mental elements, solicitation, attempt, and conspiracy; crimes against the person, against property, and against both; statutory offenses; criminal procedure, with consideration of Federal Rules of Criminal Procedure. Evening.
- 150 *Real Property* (2) Benson  
Historical background of estates and conveyances, possessory estates, concurrent estates. Evening.



- 210 *Business Associations* (4) Weaver  
 Contrast of the partnership and corporation as alternative forms of organization; ownership partnerships and corporations; liabilities, capital contributions, share structure; problems of operation; relations between partners; roles of shareholders, directors, officers; control devices; distribution to owners; voluntary reorganization, dissolution and termination. Evening.
- 219 *Commercial Paper* (4)  
 Bills of exchange, promissory notes and checks, especially under the Negotiable Instruments Law. Evening.
- 235 *Domestic Relations* (2) Benson  
 Marriage, annulment, and divorce; adoption and custody of children; minority relations. Evening.
- 240 *Evidence* (4) Fryer, Weston  
 Functions of court and jury; qualification and examination of witnesses; opinion, relevancy, and admissibility of evidence; proof of writings; application of the hearsay rule. Morning and evening.
- 318 *Creditors' Rights* (4)  
 Remedies of unsecured creditors; judgments, fraudulent conveyances, creditors' agreements, equity and statutory receiverships, and bankruptcy. The general approach is that of law administration. Evening.
- 376 *Restitution* (2) Mayo  
 Remedies at law and in equity for restitution of benefits conferred, especially as based on the concept of unjust enrichment. Morning.

## MATHEMATICS

- 3 *College Algebra* (3) The Staff  
 Prerequisite: one year each of high school algebra and high school geometry. Morning and evening.
- 6 *Plane Trigonometry* (3) The Staff  
 Prerequisite: two years of high school algebra and one year of high school geometry, or Mathematics 3. Morning and evening.
- 12 *Analytic Geometry* (3) The Staff  
 Prerequisite: Mathematics 6, or two years of high school algebra, one year of high school geometry, and one-half year of high school trigonometry. Morning and evening.
- 19 *Differential Calculus* (3) The Staff  
 Prerequisite: Mathematics 12. Morning and evening.
- 20 *Integral Calculus* (3) The Staff  
 Prerequisite: Mathematics 19. Morning and evening.
- 123 *Calculus and Differential Equations* (3) The Staff  
 Prerequisite: Mathematics 20. Morning and evening.

- 125 *Advanced Algebra* (3) The Staff  
Prerequisite: Mathematics 20. Evening.
- 270 *Tensor Analysis* (3) Taylor  
Evening.

## PHARMACY

- 192 *Hospital Pharmacy: Prescription Practice* (1) Cooper  
Prescription practice in the University Hospital Pharmacy. Prerequisite: Pharmacy 192. Laboratory—time to be arranged.
- 194 *Manufacturing Pharmacy* (3) Cooper  
The manufacture of bulk pharmaceuticals in the University Hospital Pharmacy. Elective for seniors. Lecture and laboratory—time to be arranged.

## PHILOSOPHY

- 51 *Introduction to Philosophy* (3) Schlager  
A critical introduction to the problems of modern philosophy in relation to scientific and social developments since the Renaissance. Evening.
- 112 *History of Philosophy* (3) Schlager  
The development of philosophical thought from medieval times to the end of the eighteenth century. Morning.
- 193 *Topics in Contemporary Philosophy* (3) Schlager  
Reflection and discussion of selected works of important contemporary philosophers such as Ayer, Carnap, Dewey, Stace, and Whitehead. Evening.

## PHYSICS

- 5 *General Physics* (3) Harrison  
An introduction to the phenomena of light, heat, sound, energy, and the properties of matter. This course may be taken as a terminal course by non-science students who wish an introduction to the physical sciences. Prerequisite: high school algebra and plane geometry. Material fee, \$11. Lecture and laboratory—morning and afternoon.
- 6 *General Physics* (3) Kechl  
Mechanics, wave-motion, and sound. Prerequisite: Physics 5\*; high school algebra and plane geometry. Material fee, \$11. Lecture, recitation, and laboratory—afternoon.
- 7 *General Physics* (3) Harrison  
Elementary electricity and magnetism. Prerequisite: Physics 5\*. High school algebra and plane geometry. Material fee, \$11. Lecture, recitation, and laboratory—afternoon and evening.

\* This prerequisite may be waived for students who have credit for a high school physics course which included substantial laboratory work, provided they pass the pre-entry examination given at the rates specified in the University calendar.

**8 General Physics (3)**

Koehl

This course is the fourth in the sequence of courses 5, 6, 7, and 8, and emphasizes the connection between the fundamental principles studied in courses 5, 6, and 7, and the phenomena and theories of modern physics. Topics considered include electromagnetic waves (light, radio, and X-rays), atomic and molecular structure, radioactivity, nuclear physics, the quantum theory of matter and radiation, and the elementary particles such as electrons, protons, neutrons, and mesons. Prerequisite: Physics 6 and 7. Lecture and recitation—evening.

**138 Transistor Principles and Circuits (3)**

Oakes, Karp

Qualitative description of transistor action, introduction to transistor circuit analysis, low frequency circuits, power amplifiers, high frequency equivalent circuits, video and intermediate frequency amplifier design, linear and non-linear oscillators. Prerequisite: Physics 132 or the equivalent. Evening.

**POLITICAL SCIENCE\*****9 Government of the United States\* (3)**

Brewer, West

The structure, powers, and operation of the Federal Government: Congress, the President, and the Supreme Court; elections, political parties, and pressure groups. Morning and evening.

**10 Government of the United States\* (3)**

LeBlanc

Analysis of the structure, powers, and operation of state and local government; civil rights, major functions of government at federal, state, and local levels. Evening.

**105 The Governmental Process of the District of Columbia (3)**

LeBlanc

Legal structure and political problems of the District of Columbia including restrictions on home rule, congressional regulations, and grant politics. Evening.

**107 Problems in Modern Political Thought (3)**

Kraus

Development of democratic political institutions and analysis of the major challenges to constitutional democracy in the 19th and 20th centuries. Evening.

**113 Political Problems of the British Commonwealth of Nations (3)**

Kraus

Transition of the Colonial Empire into the modern Commonwealth: questions of equal partnership, and governments and politics in the principal dominions. Morning.

**121 The Constitution of the United States (3)**

West

The judicial power of the Federal courts in constitutional interpretation. Special attention to state-federal relationships, taxation, and legislative-executive-judicial relationships. Morning.

\* Six hours of introductory Political Science courses are prerequisite to all senior-level courses.



- 151 *Public Administration* (3) LeBlanc  
Introductory survey of the theory and practice of governmental administration and its relation to politics, legislation, the courts, and non-governmental organizations and interests. Morning.
- 171 *International Politics* (3) Ludden  
Basic forces underlying the conduct of international relations and the formation of foreign policy; power politics, imperialism, collective security, and international cooperation. Morning.
- 172 *International Organization: The United Nations* (3) Ludden  
Development and current operation of international organization within the system of sovereign states with emphasis on the United Nations. Evening.
- 177 *Recent Trends in Latin American Politics and Government* (3) Davis  
Type of government, recent developments, and current political conditions in each of the twenty Latin American republics. May not be taken by students who have had Political Science 176 for credit. Evening.
- 181 *International Law* (3) Brewer  
Survey of the public law of nations with particular emphasis on the law of peace. Morning.
- 220 *Reading Course in Political Theory* (3) Kraus  
Readings and group discussion, principally on modern political and constitutional theory since the 17th century. Evening.
- 279 *Reading Course in International Affairs* (3) Ludden  
Reading and discussion of basic materials designed to stimulate investigation of problems in the nature and development of international law, politics, and organization. Evening.
- 284 *Seminar: International Law and Relations* (3) Brewer  
Research topics in the public law of nations, with special attention to problems of pacific settlement, sanctions, war, neutrality, and war indemnities, and to their political implications. Evening.
- 274-300 *Thesis* (3-5) The Staff  
Time to be arranged.

## PSYCHOLOGY\*

- 1 *General Psychology*\* (3) Hunt, Johnson  
The fundamental principles underlying human behavior. Morning and evening.

\* Required by 1 is prerequisite to all other courses in Psychology.

- 4 *Psychology of Adjustment* (3) Caldwell  
Processes involved in the total adjustment of the individual, with emphasis on social environment; development in the individual of adjustment techniques. Evening.
- 22 *Introduction to Educational Psychology* (3) ———  
Consideration of individual and group differences, adjustments, and the psychology of learning in relation to education and training. Morning.
- 29 *Guild Psychology* (3) Johnson  
A genetic approach to the study of the child. Morning.
- 98 *Abnormal Psychology* (3) Hunt  
The causes, diagnosis, treatment, and prevention of the various types of maladjustment and mental disorders. Morning.
- 131 *Psychological Tests* (3) ———  
A survey of psychological tests and their more common uses in business, industry, government, law, medicine, and education. Material fee, \$7. Evening.
- 144 *Personnel Psychology* (3) Mosell  
The applications of psychology to personnel work in education, business, industry, and government. Evening.
- 151 *Social Psychology* (3) Tuthill  
The social foundations of attitudes and behavior. Individual adjustment to group situations, such as the family, school, fraternity, and occupation. The psychological basis of race prejudice, nationalism, and war. Evening.
- 156 *Psychology of Propaganda and Public Opinion* (3) Tuthill  
The psychology of opinion formation, measurement of opinion, social determinants of attitudes, psychological processes in propaganda, basis of receptivity to propaganda, psychological warfare. Evening.
- 193 *Readings in Psychology* (3) The Staff  
For undergraduate majors. Supervised reading and conference on specific topics in psychology. Open only to students with 18 or more credits in psychology with a quality-point index of 3.00 or higher. Permission of staff member under whom course is to be taken is necessary. Hours to be arranged.
- 205 *Field Work in Psychology* (3) The Staff  
Supervised field work in agencies providing psychological service. Admission by permission of the Executive Officer of the Department. Hours to be arranged.
- 207 *Readings in Psychology for Graduate Students* (3) The Staff  
Supervised reading with conference on specified topics in psychology. Permission of staff member under whom course is to be taken is necessary. Hours to be arranged.

- 225 *Seminar: Mental Hygiene* (3) Caldwell  
A study of mental health problems with special attention to programs of prevention. Evening.
- 227 *Seminar: Counseling and Guidance* (3) Sylvester  
Recent developments and current problems in vocational, educational, and personal guidance in various types of agencies with particular reference to education. Prerequisite: educational or psychological measurements and Psychology 129 or the equivalent. Evening.
- 244 *Seminar: Job Analysis and Evaluation* (3) Mosé  
Evening.
- 295 *Research in Psychology* (att.) The Staff  
Hours and credits to be arranged.
- 299 *Thesis* (3) The Staff  
Hours to be arranged.

## RELIGION

- 59 *History of Religion* (3) Olmstead  
Judaism, Christianity, and Islam; analysis of their origin, evolution, and contemporary status. Morning.
- 172 *Religion in American Culture* (3) Olmstead  
Growth of religious bodies and institutions in American culture, the heritage of religious freedom and diversity, religion and literature, revivalism and education, science and religious thought, divisions and cooperative movements in religion. Evening.

## ROMANCE LANGUAGES AND LITERATURES

## FRENCH

- 1-2 *First-year French* (3-3) The Staff  
For beginners. Grammar, composition, drill in pronunciation, translation of modern French prose. Full-year (summer) credit will not be given for French 1 until French 2 is completed. Second half begins July 15. Morning and evening.
- 3-4 *Second-year French* (3-3) The Staff  
Advanced grammar and composition, reading in modern French prose, and practice conversation in French conversation. Full-year course credit will not be given for French 3 until French 4 is completed. Prerequisite: French 1-2 or two years of high school French. Second half begins July 15. Morning and evening.
- 9-10 *French Conversation and Composition* (3-3) The Staff  
Second half begins July 15. Morning and evening.



## SPANISH

- 1-2 *First-year Spanish* (3-3) The Staff  
For beginners. Grammar, composition, drill in pronunciation, reading of modern Spanish prose. Full-year course; credit will not be given for Spanish 1 until Spanish 2 is completed. Second half begins July 15. Morning and evening.
- 3-4 *Second-year Spanish* (3-3) The Staff  
Advanced grammar and composition, reading of modern Spanish prose, oral practice, introduction to Hispanic civilization. Full-year course; credit will not be given for Spanish 3 until Spanish 4 is completed. Prerequisite: Spanish 1-2 or two years of high school Spanish. Second half begins July 15. Morning and evening.
- 9-10 *Spanish Conversation and Composition* (3-3) The Staff  
Second half begins July 15. Morning and evening.

## SECRETARIAL STUDIES

- 1 *Elementary Typewriting* (3) Shortt  
Fundamental techniques of typewriting, basic styles of business letters, introduction to tabulation, and preparation of general office forms. Laboratory fee, \$7. Evening.
- 2 *Intermediate Typewriting* (3) Shortt  
The business letter and its arrangement, advanced tabulation, manuscript typing, office forms, stencil cutting, and legal documents. Prerequisite: Secretarial Studies 1 or the equivalent; ability to type accurately at 30 words a minute. Laboratory fee, \$7. Evening.
- 11 *Elementary Shorthand and Transcription* (3) Shortt  
A study of the principles of Gregg shorthand correlated with dictation and transcription. Minimum dictation speed of 60 words a minute attained. Laboratory fee, \$3. Evening.

## SLAVIC LANGUAGES AND LITERATURES

- 1-2 *First-year Russian* (3-3) Yakobson, Zouboff  
Beginner's course in fundamentals of grammar and pronunciation, with graded reading, oral drill, and written practice. Second half begins July 15. Evening.

## SOCIOLOGY\*

- 1 *Man in Modern Society*\* (3) Lavell, Stephens  
Origins and development of culture, the impact of groups and institutions on man's social behavior, social processes, social change, and social control. Morning and evening.

\* Sociology 1 is prerequisite to all other courses in Sociology.

- 161 *Social Stratification; Class and Status* (3) Lavell  
Nature of class structure, patterns of status, prestige relations in American society, differential class behavior, and analysis of comparative social structure. Evening.
- 164 *Social Control* (3) Stephens  
Informal and formal phases of human control, analysis of methods of control used in modern society and the situations in which they occur, policies and techniques of control. Morning.
- 295-96 *Research* (211.) The Staff
- 299-300 *Theory* (3-3) The Staff

## SPEECH

- A *Speech Clinic* Pettit, Bielski  
Individual or group lessons, without academic credit, for such speech difficulties as lisp, stammer, accent, pronunciation, and stuttering. Fee: for individual lesson \$7; for group lesson, \$4. Time to be arranged.
- B *American Speech for Foreign Students* (3) Bielski  
Class limited to foreign-born students. Instruction in the formation of the sounds of spoken English, with emphasis on rhythm and inflection. The International Phonetic Alphabet is used. Analysis of individual voices through recordings. Recording fee, \$5.50. Evening.
- 1 *Effective Speaking* (3) Leggette and Staff  
Preparation and delivery of extemporaneous speeches, developing confidence and poise, body and voice control, selecting and organizing material. Recording fee, \$4. Morning and evening.
- 11 *Training the Speaking Voice* (3) Leggette, Pettit  
Developing ease, naturalness, and clarity in the speaking voice. Analysis of individual voices through recordings. Phonetic approach to the study of the sounds of English and the standards of speech. Recording fee, \$4. Morning and evening.
- 32 *Oral Reading* (3) Stevens  
Reading to others, theory and practice in the problems of interpreting the printed page. Prerequisite: Speech 11 or the permission of the instructor. Recording fee, \$4. Morning.
- 121 *Group Discussion and Conference Leadership* (3) Henigan  
The process of thinking and the problem solving in committees and small groups, and the methods of leading conferences and discussions. Prerequisite: 6 hours of speech or the permission of the instructor. Morning.

- 177-78 *Clinical Practice in Speech Therapy* (1-1) Pettit, Bielski  
Supervised case work in remedial speech—the University Speech Clinic and the District of Columbia Crippled Children's Society. The course may be repeated for a total of 6 semester hours. Prerequisite: Speech 175. Time to be arranged.
- 183-84 *Clinical Practice in Hearing Therapy* (1-1) Pettit  
Supervised case work with persons handicapped with hearing losses—the University Speech Clinic and the Washington Hearing Society. This course may be repeated for a total of 3 semester hours. Prerequisite: Speech 182. Time to be arranged.

### STATISTICS

- 51 *Introduction to Business and Economic Statistics* (3) Johnson  
Survey of elementary principles and procedures for presenting, analyzing, and interpreting statistical data; consideration of characteristic values, measures of variability, sampling processes, index numbers, time series analysis, and simple correlation. Prerequisite: one entrance unit in algebra. Laboratory fee, \$9. Lecture and laboratory. Morning and evening.
- 52 *Mathematics of Finance* (3) Johnson  
Interest and discount, annuities, valuation of stocks and bonds, sinking funds, amortization, valuation of depletable assets, depreciation, bonding and loan associations. Prerequisite: one entrance unit in algebra. Evening.
- 53 *Introduction to Statistics in Psychology and Education* (3) —————  
Sources of data, tabulation, charts and graphs, averages, dispersion, quartiles and percentiles, raw scores and derived scores, profiles, means and their use, frequency distributions, intelligence and other quotients, reliability and validity of tests, normal curve, correlation, elementary sampling, statistical error, limitations of statistics. Prerequisite: one entrance unit in algebra. Laboratory fee, \$9. Lecture and laboratory. Afternoon.
- 91-92 *Principles of Statistical Methods* (3-3) —————  
This course emphasizes the meaning, uses, and applications of variates and attributes, measurement and enumeration, averages and dispersion, frequency distributions and their characteristics, errors of measurement and their control, index numbers, trends, cyclical relatives, variative and random sampling in theory and practice and their errors and estimates, construction of theory, practice, and application. Prerequisite: one entrance unit in algebra. Laboratory fee, \$9 for each half. First half from June 17 to July 12, second half from July 15 to August 9. Students must register for both halves of this course unless permitted to do otherwise, in an extenuating circumstance, by the Executive Officer of the Department of Statistics. Credit will not be given for Statistics 91 until Statistics 92 is completed. Lecture and laboratory. Evening.



117 *Analysis of Variance* (3)

McCall

The analysis of variance and covariance to segregate factors producing significant variation, a method to estimate experimental error, multiple classification with unequal class frequencies. Prerequisite: Statistics 91-92 or its equivalent. Evening

118 *Correlation and the Chi-Square Test* (3)

Advanced study of simple, partial, and multiple correlation. Rank correlation, the method of contingency, and the problem of normal and non-normal populations. Tests of independence, likeness, and goodness of fit. Prerequisite: Statistics 91-92 or its equivalent. Evening

## ZOOLOGY

1-2 *Introduction to Zoology* (4-4)

Mortensen, Hansen

An introduction to the study of the structure, functions, and relation of animals, and of the fundamental biological principles involved. Material fee, \$11 for each half. Nine-week term. Zoology 2 begins July 18 and ends August 16. Lecture and laboratory. Evening.

138 *Histology* (3)

Desmond

An introduction to the microscopical anatomy of normal tissues and organs. Prerequisite: Zoology 1-2 or its equivalent. Material fee, \$11. Eight-week term. Lecture and laboratory. Evening.

295 *Research* (3)

The Staff

Investigation of special problems. Hours to be arranged.

299 *Thesis* (3)

The Staff



THE CATALOGUE ISSUE

1957-58





THE  
GEORGE  
WASHINGTON  
UNIVERSITY  
BULLETIN

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VOL. LXI

No. 5

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BY THE UNIVERSITY





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THE UNIVERSITY CALENDAR



1957

July

S	M	T	W	T	F	S
..	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	..	..	..

August

..	..	..	..	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

September

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	..	..	..	..	..

October

..	..	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	..	..

November

..	..	..	..	1	2	..
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

December

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	..	..	..	..

1958

January

S	M	T	W	T	F	S
..	..	..	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	..

February

..	..	..	..	..	..	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	..

March

..	..	..	..	..	..	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	..	..	..	..	..

April

..	..	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	..	..	..

May

..	..	..	1	2	3	..
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

June

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	..	..	..	..	..

July

S	M	T	W	T	F	S
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6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	..	..

August

..	..	..	..	..	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	..	..	..	..	..	..

September

..	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	..	..	..	..

October

..	..	..	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	..

November

..	..	..	..	..	1	..
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	..	..	..	..	..	..

December

..	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	..	..	..

# THE UNIVERSITY CALENDAR \*

## 1957-58

Date	Day	Observation
1957		
FALL SEMESTER		
Sept. 3-13 .....	Tuesday through Friday .....	Preadvising for all entering Junior College and School of Engineering students
Sept. 12 .....	Thursday .....	Orientation Assembly for all new students
Sept. 13 and 16. Sept. 17 .....	Friday and Monday .. Tuesday .....	Curriculum assemblies† Freshman tests
Sept. 18 .....	Wednesday .....	Examinations for students who wish to qualify for advanced courses or waive curriculum requirements
Sept. 19 and 20. Sept. 23 .....	Thursday and Friday .. Monday .....	Meeting of the University Faculty
Oct. 4 .....	Friday .....	Registration* Academic year begins* Last day on which candidates may file thesis subjects for the Master's degrees to be conferred in February
Oct. 10 .....	Thursday .....	Stated meeting of the Board of Trustees
Oct. 19 .....	Saturday .....	Fall Convocation
Nov. 11 .....	Monday .....	Veterans Day. Holiday
Nov. 26 .....	Tuesday .....	Meeting of the Academic Council
Nov. 28-30 .....	Thursday through Saturday .....	Thanksgiving recess
Dec. 12 .....	Thursday .....	Stated meeting of the Board of Trustees
Dec. 23-Jan. 4	Monday through Saturday .....	Christmas recess
1958		
Jan. 6 .....	Monday .....	Classes resume Last day for receiving theses of candidates for the Master's degrees and for the professional degrees in Engineering to be conferred in February Last day for receiving dissertations of candidates for the degrees of Doctor of Philosophy, Doctor of Education, and Doctor of Business Administration to be conferred in February Last day for receiving dissertations of candidates for the degree of Doctor of Dental Science to be conferred in June

\* In the School of Medicine, registration is conducted September 12, classes begin September 16  
† All new students are expected to attend one Curriculum Assembly.

## THE UNIVERSITY CALENDAR—Continued

Date	Day	Occasion
Jan. 15 .....	Wednesday .....	Last day of classes for the fall semester
Jan. 20-28 .....	Monday through Tuesday .....	Examination period
SPRING SEMESTER		
Jan. 20 .....	Wednesday .....	Examinations for students who wish to qualify for advanced courses or waive curriculum requirements
Jan. 30 and 31. Feb. 3 .....	Thursday and Friday Monday .....	Registration Classes resume for the spring semester
Feb. 13 .....	Thursday .....	Stated meeting of the Board of Trustees
Feb. 14 .....	Friday .....	Last day on which candidates may file thesis subjects for the Master's degrees to be conferred in June
Feb. 22 .....	Saturday .....	Winter Convocation. Holiday
March 1 .....	Saturday .....	Applications for fellowships for 1958-59 should be filed
March 13 .....	Thursday .....	Stated meeting of the Board of Trustees
March 25 .....	Tuesday .....	Meeting of the University Faculty
April 1 .....	Tuesday .....	Applications for scholarships for 1958-59 should be filed
April 4-9 .....	Friday through Wednesday .....	Easter recess
April 11 .....	Friday .....	Last day for receiving dissertations of candidates for the degrees of Doctor of Philosophy, Doctor of Education, and Doctor of Business Administration to be conferred in June
April 29 .....	Tuesday .....	Meeting of the Academic Council
May 2 .....	Friday .....	Last day for receiving theses of candidates for the Master's degrees and for the professional degrees in Engineering to be conferred in June
May 8 .....	Thursday .....	Annual meeting of the Board of Trustees
May 14 .....	Wednesday .....	Last day of classes for the spring semester
May 19-27 .....	Monday through Tuesday .....	Examination period
June 1 .....	Sunday .....	Baccalaureate Sermon
June 4 .....	Wednesday .....	Commencement



## THE UNIVERSITY CALENDAR—Continued

Date	Day	Occasion
<b>SUMMER SESSIONS*</b>		
June 16 .....	Monday .....	Registration for the eight-week term
June 17 .....	Tuesday .....	Classes begin
July 4 .....	Friday .....	Independence Day. Holiday
Aug. 8 .....	Friday .....	Eight week term ends
		Last day for receiving theses for the Master's degrees and for the professional degrees in Engineering to be conferred in October
Sept. 5 .....	Friday .....	Last day for receiving dissertations of candidates for the degrees of Doctor of Philosophy, Doctor of Education, and Doctor of Business Administration to be conferred in October
Sept. 18 and 19 .....	Thursday and Friday .....	Registration for the fall semester of the academic year 1958-59

\* For all schools and colleges offering courses in the Summer Sessions except the Law School and the School of Education.

The dates of the calendar of the Law School will be announced.

The calendar for the special sessions of the School of Education is as follows: Pre-session, June 9-27; Six-Week Session, June 30-August 8. Post-session, August 11-29. Registration for each of these sessions is on the first day of classes.



OFFICERS AND COMMITTEES  
OF THE UNIVERSITY





## THE BOARD OF TRUSTEES

The Board of Trustees of the University is composed of the President of the University *ex officio* and the following persons by election:

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 Alfred Henry Lawson, LL.B., LL.D.; 4901 Indian Lane  
 John Keown McKee; 3901 Fifty-second Street  
 Benjamin Mosby McKelway; The Evening Star Building  
 \*James Matlack Mitchell, A.M.; National Science Foundation  
 Donald D'Arcy Shepard, LL.B.; 1701 K Street  
 Lloyd Bennett Wilson; Willow Spring, Blount, Virginia

1958

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 \*Watson Davis, B.S. in C.E., C.E.; 1719 N Street  
 Robert Vedder Fleming, LL.D.; Riggs National Bank  
 Charles Carroll Glover, Jr., A.M., LL.B., LL.D.; Riggs National Bank  
 Godfrey Leon Munter, A.B., LL.B., LL.D.; Municipal Court for the District of Columbia  
 James Edwin Webb, A.B., LL.D.; 218 N. Robinson Street, Oklahoma City, Oklahoma  
 Alexander Wetmore, Ph.D., Sc.D.; Smithsonian Institution  
 \*Charles Stanley White, M.D., Sc.D.; 1801 I Street

1959

Clarence Aiken Aspinwall, LL.D.; 1140 Fifteenth Street  
 \*Daniel LeRay Borden, A.M., M.D.; 1835 I Street  
 Lyman James Briggs, Ph.D., Sc.D., D.Eng., LL.D.; 3208 Newark Street  
 Eugene Cassin Carusi, A.M., J.D.; Union Trust Building  
 Mrs. Joshua Evans, Jr., A.B., Ed.D.; 3405 Lowell Street  
 Ulysses S. Grant, 3d, B.S., Graduate United States Engineers School, LL.D., Sc.D.; 1135 Twenty-first Street  
 John Edgar Hoover, LL.M., LL.D.; United States Department of Justice

\* Nominated by the alumni

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New York City

\*Miss Helen Newman, LL.M.; Library, United States Supreme Court  
Sidney William Souers, A.B., LL.D.; General American Life Insurance  
Company, St. Louis, Missouri

Walter Rupert Tuckerman, A.B., LL.B., LL.D.; 5215 Edgemoor Lane,  
Bethesda, Maryland

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Robert Vedder Fleming

*Secretary of the Board of Trustees*

Newell Windom Ellison

*Assistant Secretary of the Board of Trustees*

Clarence Aiken Aspinwall

---

\* Nominated by the alumni.



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The Chairman of the Board of Trustees and the President of the University shall be members *ex officio* of each of the committees of the Board. The President of the University shall be Chairman of the Executive Committee.

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Mr. Wetmore; Dr. White

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Mr. Wetmore

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COMMITTEE ON PERSONNEL

Mr. Wilson, *Chairman*; Mrs. Evans; Mr. McKee; Mr. Tuckerman

COMMITTEE ON EXTRA-CURRICULAR ACTIVITIES

Mr. Brookes, *Chairman*; Dr. Borden; Mr. Carusi; Mr. Hays

COMMITTEE ON PUBLIC RELATIONS

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General Grant; Mr. Webb

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Henry William Herzog, B.S., *Treasurer*  
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\_\_\_\_\_, *Dean of the School of Medicine; Medical Director of the University Hospital*  
\_\_\_\_\_, *Dean of the Law School*  
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James Harold Fox, A.M., Ed.D., *Dean of the School of Education*  
\_\_\_\_\_, *Dean of the School of Government*  
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Warren Reed West, Ph.D., *Dean of the Division of Special Students*  
\*Mitchell Dreese, Ph.D., *Dean of the College of General Studies*

\* On leave of absence fall semester 1957-58.

Victor Frederick Ludewig, A.B., B.S., *Administrator of the University Hospital*

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William Lewis Turner, Ph.D., *Assistant Dean of the Junior College*

Carr Bartleson Lavell, A.M., *Assistant Dean in the Junior College*

Angus MacIvor Griffin, Ph.D., *Assistant Dean of the School of Medicine*

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Joe Lee Jessup, M.B.A., *Assistant Dean in the School of Government*

Grover LaMarr Angel, A.M., Ed.D., *Assistant Dean of the College of General Studies*

John Gage Allee, Jr., Ph.D., *Assistant Dean of the Division of University Students*



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The Dean of Faculties, *Vice Chairman*  
The Director of Admissions  
The Registrar  
The Librarian  
The Administrative Secretary

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The Dean of the School

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The Dean of the School

Joseph Henry Krupa

Carol Ruth St. Cyr

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The Dean of the School

John Withrow Brewer

Edward Campion Acheson

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The Dean of the College

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The Dean of the Division

## THE DIVISION OF SPECIAL STUDENTS

The Dean of the Division

## THE DIVISION OF AIR SCIENCE

The Director of the Division

## THE SUMMER SESSIONS

The Dean of the Summer Sessions

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The Administrative Secretary  
The Coordinator of Scientific Activities  
The Dean of the Junior College  
The Dean of Columbian College  
The Chairman of the Graduate Council  
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The Dean of the Law School  
The Dean of the School of Engineering  
The Dean of the School of Pharmacy  
The Dean of the School of Education  
The Dean of the School of Government  
The Dean of the College of General Studies  
The Dean of the Division of University Students  
The Dean of the Division of Special Students  
The Dean of the Summer Sessions

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Robert Aaron Hechtman  
Carville Dickinson Benson  
Paul Calabrisi  
Harold Griffith Sutton, *Ex officio*

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Robert Hamilton Moore  
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Fred Everett Nessell  
John Collum Einbinder

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 Wood Gray

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The Research Projects listed in this section are special projects which are set up for the specific purpose of attacking in an academic atmosphere problems submitted by the sponsoring agency. Cooperation between these projects and the various departments of instruction is as close as the nature and needs of the projects and departments will permit. The projects are listed in the order in which they were undertaken by the University.

### THE ELECTRONICS RESEARCH PROJECT

The Electronics Research Project does work in the general field of Nucleonics, the improvement of the operations of photomultiplier tubes, and the development of fast operating coincidence measurements, flip-flop circuits, and pulse generators. This project operates under contracts with the Department of the Navy.

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### THE LOGISTICS RESEARCH PROJECT (NAVY)

The purpose of the Logistics Research Project is to study Logistics problems in all their aspects, to develop more efficient and expeditious methods of solving Logistics problems, and the application of computing machine techniques to the solution of these problems. As part of this study a large collection of operating data is being classified and coded for statistical study using modern machine methods. This project is operated under a contract with the Department of the Navy.

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### ARMY LOGISTICS RESEARCH PROJECT

The Army Logistics Research Project is engaged in a program of research leading to the development of logistics theory and its application to a Modern Army Supply System. The activity involves systems design, the analysis of performance of designed systems and sub-systems under field conditions, and the development of procedures to meet logistical operational criteria for the Army of the future.

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Journal of the American Medical Association, December 15, 1960, 178:1059-1060.

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 Charles Nelson Mitchell, Jr., Bookworm Clerk in Chemistry  
 Catherine Joseph A.B., Technician in Pathology  
 Joe Graham Franklin, Technician in Neurology and Neurological Surgery  
 Caroline Amelia Woodruff, M.S., Technician in Anatomy

OFFICE OF THE DIRECTOR OF ADMISSIONS

Margaret Liliusgatan Tyronen, A.B., Assistant to the Director of Admissions  
 Kenneth Joseph Marcus, Secretary to the Director of Admissions  
 Professor Maria Yates, A.B., Admissions Advisor  
 James Earl Pinner, Enrollment  
 Stanley Howard, Technician, A.B., Enrollment  
 Charlotte Tamm, A.M., Enrollment  
 Joan Wilson McConner, A.M., Enrollment  
 Irving Maxwell Smith, A.B., Enrollment  
 Victoria Lachmann, Enrollment  
 Mary MacLeod Adair, B.S., Admission Assistant  
 Lucile Barbara Carpenter, B.S., Admission Assistant  
 Mary Fern Elliott, Clerk-Typist  
 Susan Wilson, Clerk-Typist  
 Ruth Tamm, Clerk-Typist

OFFICE OF THE REGISTRAR

Richard Warner White, A.B., Assistant Registrar  
 Virginia Rose Schmitt, Secretary to the Registrar  
 Elsie Johnson Ostry, Secretary to the Registrar



Grumley May Chen, *Transcript Clerk*  
 Mildred Vae Hsueh Loo, *Statistical Clerk*  
 Maurice Dickson, *Statistical Clerk*  
 Patricia Jane Jewell, *Transcript Clerk*  
 Barbara Ann Hopkins, *Transcript Clerk*  
 Barbara Ann Brown, *Record Clerk*  
 Emily Fay Sutton, *Record Clerk*  
 Maryjane Louise Chen, *Record Clerk*  
 Maryjane Bennett, *Balance Sheet Clerk*  
 Helen Chen, A.B., *Graduation Clerk*  
 Marjorie Johnson, *File Clerk*

## THE LIBRARY

James Walton, A.B., M.S. in L.B., *Assistant Librarian*  
 Anna Virginia Smith, A.B., *Assistant Librarian, Department*  
 Mary Elizabeth Thompson, B.S., B.L. in L.B., *Assistant Librarian, Cataloguing*  
 Lucille Frances Young, A.B. in L.B., *Assistant Librarian, Medical Library*  
 Bertha Marguerite Smith, A.M., B.E. in L.B., LL.B., LL.M., *Assistant Librarian, Law Library*  
 Alice Russell, B.S., *Assistant, Cataloguing*  
 Vera Washburn, *Assistant, Medical Library*  
 Alice Pauline Bray, B.S., B.L. in L.B., *Assistant, Cataloguing*  
 Charles Belmont, A.B., *Assistant, Law Library*  
 Margaret Louise Mackay, A.M., B.L. in L.B., *Assistant, Circulation*  
 Mary Karin Erickson, *Assistant, Hospital Library*  
 Grace Chastler, *Assistant, Periodical Room*  
 Helen Sewell Phillips, A.B., *Assistant, Cataloguing*  
 Joan Hubbard Hallish, *Assistant, Cataloguing*  
 DeHana Clare Smith, A.B., *Assistant, Reserve Book Reading Room*  
 Beulah Dixie, A.B., *Assistant, Circulation*  
 Mary Emma McCurdy, *Assistant, Department*  
 Edna Jean Watson, *Assistant, Department*  
 Richard Day, A.B., B.L. in L.B., *Assistant*  
 Janet Lawrence Martin, M.B., *Assistant*

## OFFICE OF UNIVERSITY DEVELOPMENT

## OFFICE OF THE ASSISTANT TO THE PRESIDENT

Edward Andrew Pratt, A.B., LL.B., *Assistant to the Office of University Development*  
 Emily Lou Weisberg, *Secretary*

DISCIPLINARY EXAMINATION OFFICE

Timothy Edward Smith, A.M., *Educational Counselor*  
Helen Sigurd Smith, Ph.D., *Administrative Counselor*

FOURTH FLOOR OFFICE

Margaret Davis, A.M., *Assistant Director of Public Relations*  
Donald Bruce Calender, *Staff Writer*  
Lucy Jane Pore, A.B., *Staff Writer*  
Jane Pennington Long, A.B., *Staff Writer*  
John Samuel Tanner, S.E., *Assistant to the Director of Public Relations*  
Edward Carroll Hall, *Public Relations Liaison*

ADMINISTRATIVE OFFICE

Warren Gould, A.M., *Director of Alumni Relations*  
Mary Dine, A.B., *Assistant to the Director*  
Marjorie Harbelle Lee, *Clerical Assistant*  
Robert Turner, *Business Clerk*

OFFICE OF THE COORDINATOR OF SCIENTIFIC ACTIVITIES

Frank Donald Hart, *Assistant to the Coordinator*  
John King, LL.B., *Assistant to the Coordinator*  
Louise Woot, *Secretary*

OFFICE OF THE PATENT, TRADEMARK, AND COPYRIGHT FOUNDATION

Lois Jones Harris, A.B., LL.B., S.J.D., LL.M., *Assistant Director*  
Bernard Jews Whit, A.B., *Assistant to the Assistant Director*  
Sara Blair Whit, A.B., *Secretary*  
Donald Ruth Pore, S.E., *Executive Assistant*

SECURITY SERVICES

Virginia Alan Gould, A.M., *Assistant to the Director for Security*  
Elizabeth Huntington, *Secretary, Office of the Director of Security*  
Edward Evans, A.B., *Training Assistant in the Office of the Director of Security for Men*  
Marie Jane Vandenberg, S.E., *Business Assistant, Security*

INTERNATIONAL ACTIVITIES

Robert Fitch, B.S., *Director of Athletics*  
 William Jennings Schickel, B.B.A., *Head Baseball and Head Basketball*  
*Coach*  
 Eugene Hughie Swenson, Jr., B.S., *Head Football Coach*  
 Raymond George Harker, B.S. in P.E., A.M. in P.E., *Assistant Football*  
*Coach*  
 James Joseph Fuchs, B.S., *Assistant Football Coach*  
 Harry Linnert, *Athletic Trainer*  
 Truman Montague, *Secretary to the Office of Men's Athletics*

MINORIAN ACTIVITIES

Robert Henry Hanson, B.S., B.E.E., *Director of the Glen Club*  
 Elmer Ralph Hanson, *Assistant Director of the Glen Club*

VETERAN'S EDUCATION

James William Johnson, A.M., *Assistant Director of Veterans' Education*  
 Margaret Lamb, A.E., *Assistant to the Director of Veterans' Education*  
 Cora Lee Thoreson Hume, *Recruitment and Credit Clerk*

RESIDENTS AND RESIDENT HALLS

Eric Van Winkle, B.S., *Head of Harris M. Irving Resident Hall for Women*  
 Virginia Randolph Kilduff, A.M., *Head of Young Hall, men's*  
*Hall*





THE UNIVERSITY



## HISTORY AND ORGANIZATION

### HISTORY

The idea of a university located in the Capital of the Nation was sponsored by George Washington, who during his public life urged the establishment of such an institution and who in his will left fifty shares of stock in the Potomac (C&D) Company for the endowment of a university to be established in the District of Columbia "in which the youth of fortune and talents from all parts thereof might be sent for the improvement of their Education in all branches of polite literature,—in arts and sciences,—in acquiring knowledge in the principles of Politics & good Government."

It was George Washington's hope that the "Central Government" would extend towards such an institution "a fostering hand". His wish was taken by Congress to carry out the promise of Washington's will, and the work must be hastened for the establishment of a university in the District of Columbia became valuable owing to the failure of the Potomac Canal project.

Meanwhile, however, a movement was started by private persons under the leadership of Luther Rice to establish an institution of higher learning at the seat of the National Government for the education of the Southern minority and to afford general collegiate training. In 1819 an association was formed by Luther Rice, Obadiah H. Brown, James H. Cane, and Emily Reynolds for the purpose of raising funds to be used for the use of the college.

A group of the Southern leaders who were specially interested in Washington's plan became persons of the willow and contributed towards raised for the purchase of land and erection of buildings. Among them were James Monroe, President of the United States; William H. Crawford, Secretary of the Treasury; John C. Calhoun, Secretary of War; William Wirt, Attorney General; Andrew J. Menz, Postmaster General; and numerous members of Congress.

Legislation to implement the college a petition was made to Congress for the incorporation of "the General Convention of the Baptist Churches in the District of Columbia for evangelist and literary purposes". This petition was passed by Congress on April 16, 1820, because of its non-sectarian character.

Failing to obtain a denominational charter, members of the association enlarged their objective to embrace national aims, and with the sponsorship of Government leaders there was presented to Congress a bill for the incorporation of "the Columbian Society for literary and

ment", is being prepared to confer in this way "the restrictions of Washington, Jefferson, and Madison, but the freedom of a university at the end of the Federal government."

Acting upon this second petition, on February 9, 1840, Congress directed Columbia College in the District of Columbia, according to the charter to spend upon the petition "that amount of money (subject to appropriation) shall be capable of being placed. Therefore, we shall, my friends, either as President, President, there is profit, to extend an amount and College to extend any of the privileges mentioned in the petition already, but as an amount of the amount in nature of college."

Then Columbia College in the District of Columbia was chartered by Congress as one of the early universities of higher learning in the United States, under the distinguished name of President James Madison and members of his Cabinet.

A tract of approximately four square acres, extending about one-half mile southeast of Boundary Street (Florida Avenue) between First Street and Pennsylvania Avenue, was acquired and in 1840 the main building was completed sufficiently to use.

Two years later, when the first Commencement was held on December 15, 1842, Congress and the Supreme Court authorized their money to enable their members to attend the session. President Madison, John Quincy Adams, John C. Calhoun, Henry Clay, and the Marquis de Lafayette headed the session members in attendance.

In an act of Congress of March 2, 1843, the name of the college was changed to "Columbia University", in recognition of the enlarged scope of the institution. In 1845 the University was moved from its first location on "College Hill", near Columbia Heights to the new University Hall built for it at Fifteenth and H Streets. Next to buildings were purchased the School of Medicine and Law School, the Law School.

For a period of six years, from 1845 to 1851, the University was placed under control of the Board of Trustees. In 1851 an act restoring the original transfer of control of the University and authorizing change of name to The George Washington University was passed by Congress.

Eventually all colleges, schools, and divisions of the University were the School of Medicine were brought together in the area bounded by Maryland, Pennsylvania, and H Streets, and Pennsylvania Avenue NW. The School of Medicine is situated on H Street between Third and Pennsylvania Streets NW.

The mission of the University is to educate.

In 1851 a new plan of academic organization for the Board of Trustees was adopted to the establishment of the Junior College and the reorganization of graduate work, as indicated below.



## THE COLLEGE, SCHOOLS, AND DIVISIONS

The George Washington University includes numerous colleges, schools, and divisions, as follows:

The Junior College offers the work of the first two years of the four-year college program in the liberal arts and sciences and two years of professional work. Each of these curricula leads to the degree of Associate in Arts. It also offers numerous noncredit courses. Those in Accounting and Commercial Studies lead to the degree of Associate in Arts; those in Home Economics, Medical Technology—Basic Course, and Physical Science lead to the degree of Associate in Science.

Colburn College offers the work of the fourth and sixth years of the four-year college program in the liberal arts and sciences leading to the degrees of Bachelor of Arts and Bachelor of Science. It also offers the studies leading to the degrees of Master of Arts and Master of Science in the fields of liberal arts and sciences.

The Graduate Council offers a program of advanced study and research leading to the degree of Doctor of Philosophy.

The School of Medicine offers work leading to the degree of Doctor of Medicine.

The Law School offers professional and graduate courses leading to the degrees of Bachelor of Laws, Juris Doctor, Master of Laws, Master of Comparative Law, and Doctor of Juridical Science.

The School of Engineering offers courses leading to the degrees of Bachelor of Civil Engineering, Bachelor of Electrical Engineering, Bachelor of Mechanical Engineering, Bachelor of Science in Engineering, Master of Science in Engineering, and Master of Engineering Administration. It also directs work leading to the professional degrees in the fields of civil, electrical, and mechanical engineering.

The School of Pharmacy offers courses leading to the degrees of Bachelor of Science in Pharmacy and Master of Science in Pharmacy.

The School of Education offers undergraduate programs leading to the degrees of Bachelor of Arts in Education, Bachelor of Science in Home Economics, and Bachelor of Science in Physical Education, and graduate studies leading to the degrees of Master of Arts in Education and Doctor of Education.

The School of Government offers undergraduate programs of study in Foreign Affairs, Public Affairs, Accounting, Business Administration, and Economics, leading to the degree of Bachelor of Arts in Government. Graduate work is offered leading to the following degrees: Master of Arts in Government in the fields of Foreign Affairs, Public Affairs, Economic Policy, Accounting, Business, and Economic Methodology and Counseling; Master of Arts in Public Administration; Master of Arts

in Personal Administration, Master of Business Administration, and Doctor of Business Administration.

The College of General Studies supplements the adult education program of the University through its Child Guidance Division, Foreign Education, and Division of Community Service.

The Division of Extension includes courses available through its various schools for students in evening classes.

The Division of Special Studies makes available courses for students in the process of qualifying for degree credit.

The Division of the School of Law is composed of the Law School, ROTC, training which is integrated with the curriculum of the college, and schools of the University and leads to appointment as a commissioned officer in the United States Air Force.

The January Session

#### Interdepartmental Division

The interdepartmental division established at The George Washington University is organized primarily on the basis of the similarity of course content, irrespective of academic and professional and scholarly of background and viewpoint. Originally there were two divisions, Language and Literature, Mathematics, and Physical Science, Natural Science, and Social Science. This plan is being reevaluated and a four-part plan is being considered with two new divisions, Social Science and Natural Science.

#### ADMINISTRATIVE AND SUPPORTIVE ACTIVITIES

##### ADMINISTRATIVE UNITS

The University maintains the following Administrative Units: Health Administration, Foreign Education, the Evening Class, the Speech Clinic, and the Training and Counseling Center.

##### Research Projects

Research projects sponsored by agencies of the Federal Government can be given translation and influence are conducted. Cooperative programs develop products and the various departments of instruction as well as in the nature and needs of the governmental community will accept.

##### ACADEMIC UNITS

The George Washington University is accredited by its regional accrediting bodies, the Middle States Association of Colleges and Secondary

Schools. This is important to students who wish to transfer credits from one institution to another.

The University is on the approved list of the American Association of University Women and is a member of the College Entrance Examination Board.

The Law School is a charter member of the Association of American Law Schools and is approved by the Section of Legal Education and Admission to the Bar of the American Bar Association. The School of Medicine is a member of the Association of American Medical Colleges and is one of the medical colleges which have been continuously approved by the American Medical Association. The School of Pharmacy is accredited by the American Council on Pharmaceutical Education as a class "C" school. It is a member of the American Association of Colleges of Pharmacy. The School of Engineering is on the accredited list of the Engineers' Council for Professional Development. The School of Education is a charter member of the American Association of Colleges for Teacher Education.

#### LOCATION

The George Washington University is in downtown Washington four blocks west of the White House and east of the Potomac River with its extensive parkway. Easily accessible to the University are most of the departments of the Government, including the Department of State, the Department of the Treasury, the Department of Justice, the Department of the Army, the Department of the Navy, the Department of the Interior, the Department of Agriculture, the Department of Commerce, and the Department of Labor, as well as the National Archives, the Capitol, the Library of Congress, the National Academy of Sciences, the Pan American Union, the National Gallery of Art, and the Corcoran Gallery of Art.

#### GOVERNMENT

The government and general educational management of The George Washington University are vested in a self-governing Board of Trustees, with the President of the University as a member ex officio. The members of the Board are elected for a period of three years and are divided into three classes. The members of one class are elected at each annual meeting or all the classes of the members whose terms of office expire. Two members of each class are nominated by the Alumni Association.

## EDUCATIONAL FACILITIES

Storage periods, not measured, are related to approximately 100 days.

The buildings of the former College, Catherine Tegen, the Graduate Council, the Law School, the School of Engineering, the School of Pharmacy, the School of Dentistry, the School of Community, the College of Career Studies, the Illinois College of University Science, the Division of Special Services, the Division of Art School, the University Hospital and Operating Department, and the Cancer Clinic are located between Broadway and University Avenue Streets, and between Pennsylvania Avenue and 42 Street NW. The School of Medicine is at Treatment and H Avenue NW. The University of the University are as follows:







instrumentation, private books is the bulk of American civilization, American literature, foreign travel, history, and public finance, and gifts from many sources have enriched the collection. The Librarian carefully removes 1,500 publications.

In the modern University Library building, erected in 1936, on the first three floors are the delivery hall, serials catalogue, reference and reserve reading rooms, periodical room, and reserve book rooms; on the fourth floor are ten planned seminar rooms; and on the fifth floor is the Graduate Council reading room for doctoral candidates. To the original Olden volume eight new wings of modern steel construction have been added; a similar wing of exposed concrete supports work in study carrels.

Of the special subject collections in the University Libraries, the most recent acquisition is the internationally known library of the Carnegie Endowment for International Peace, which was assembled during forty years of its activity in Washington, and was purchased by the University. The collection contains special bound volumes and glass pamphlets in the fields of international law and relations, history, and economics. Other collections in the Library are the W. Lloyd Wright collection of Washingtoniana, acquired in 1936; the Richard Hannell Collection of German philology and literature; the Carl Wachsmuth Collection of Greek and Roman literature, archaeology, and history; the Misses Vernon Collection on political history, international law, and the social sciences; a representative collection of Spanish American books, the gift of the government of Hispano America; and the Clarence Marshall Deane Public Speaking Collection.

Information concerning the use of the Libraries may be obtained at the Library reader desks. A classified list of cards of selected recent acquisitions is available at frequent intervals, in addition to the complete information in the card catalogue. Monthly art exhibitions are held on the first and second floors of the University Library during the academic year.

The hours of the University Library and the Law Library are Monday through Friday, 9:00 a.m. to noon p.m.; Saturday, 9:00 a.m. to 5:00 p.m.; Sunday, noon to 5:00 p.m. The Medical Library is open Monday through Friday, 9:00 a.m. to noon p.m.; Saturday, 9:00 a.m. to 1:00 p.m.

The Library is administered for the curriculum, reference, and reserve needs and interests of the students. Instruction in the use of the library is given in the required English courses, and by the reference librarians. The Library caters to some students and all members of the University as use the rich library resources of Washington and the unusual opportunities they offer for extensive research. Interlibrary loan arrangements are maintained with other libraries in the city and in the United States.

The printed list refers to the Library of Congress, the Public Library of the District of Columbia and its branches, the Library of the Pan American Union, the Library of the Bureau of Indian Affairs, the Library of the United States Department of Agriculture, the Library of the United States Office of Education, the National Academy of Medicine, the Library of the Smithsonian Institution, and many of the other great special collections of the government departments.



## ADMISSION

All colleges, schools, and divisions of the University accept new and returnees.

Students may enter any college, school, or division of the University, except the School of Medicine, at the beginning of either semester or term of the Summer Session.

Enrollment in the School of Medicine in 1927-28 is permitted only at the opening of the semester beginning September 1927.

### GENERAL ADMISSION REQUIREMENTS

The following factors are considered in determining the eligibility of an applicant for admission:

1. The amount of previous academic work as, representing for the purpose of study, past accomplishment—indicating quantity and quality of work and the standing of the institution in which it was done.

2. Results of special tests, when prescribed by the Committee on Admissions.

a. The methods of the student for the course contemplated.

b. The character of the student.

The University reserves the right to refuse admission to any student who has a previous academic record of such grade as to create doubt of his ability to pursue college work successfully or who, for any other reason, would not be a desirable student.

### APPLICATION FOR ADMISSION

An applicant for admission must obtain from the Office of the Director of Admissions an application blank which he must fill out completely and return with the application fee of \$5.00 for the School of Medicine. A recent photograph, with signature, of the applicant must be attached to the blank.

*Applications should be filed by July 1 for the fall semester, January 1 for the spring semester, and May 1 for the Summer Session.*

*An applicant from a secondary school must send the high school record form provided by the University to the high school principal with the request that the principal fill out the form and mail it directly to the Office of the Director of Admissions.*

*An applicant who has previously attended an institution of higher learning must request the registrar of that institution to mail directly to the Office of the Director of Admissions a transcript of his record. If he has attended more than one such institution he must request the regis-*

and of such candidates to send to the Office of the Director of Admissions a statement of the record, any change of grade since last session, together with an affidavit (signed) from the institution last attended.

The College Entrance Examination administered by the University Testing Service, Princeton, New Jersey, is accepted as equivalent proof of a candidate's educational standing, and the admission-board will recognize the institution last attended whenever available.

#### STATUS OF ADMITTER

##### First Session, 1906-7

An applicant from a secondary school must send in writing his plan for payment of examination.

##### By Contract

A candidate of standing with a minimum of three years' work in a accredited secondary school and the recommendation from the principal of the secondary school that the candidate is prepared to undertake college work will be considered subject to the following conditions:

1. If the school is accredited by the national accrediting association the student must not have been in the fourth year of his class.

2. If the school is not listed by the regional accrediting association but has been accredited by the state accrediting agency the student must rank in the upper three-fourths of his class.

##### By College Entrance Board Examination

An applicant may qualify by having taken the College Entrance Board examination as recommended by the Director of Admissions. These examinations are given at a large number of convenient places throughout the United States, including Washington, D. C., on May 18, August 10, and December 1, 1907, and January 10, February 8, March 15, May 15, and August 15, 1908.

Arrangements for the examination should be made with the College Entrance Examination Board, Post Office Box 100, Princeton, N. J., and that time must follow the date of the examination.

##### From Home Instruction

In addition the advanced standing may be considered for students with the permission of admission committee from an approved

\* 1. For purposes 1 and 2 only in a secondary school subject ranking in the upper three-fourths of the class.

† The University Testing Service, Princeton, New Jersey, is accepted as equivalent proof of a candidate's educational standing, and the admission-board will recognize the institution last attended whenever available.

completion of higher learning. The student must be in good standing in his scholarship and conduct, and must be eligible to return to the previously attended institution in the semester for which he seeks admission to this University.

If the transcript of record from such an institution includes the record of his secondary school work, it is not necessary for the applicant to have forwarded a separate record directly from the principal of the secondary school. High school work is considered only as fulfilling entrance requirements if it meets defined minimum standards.

Properly certified marks taken in secondary colleges or universities may be counted toward a degree at this University, subject to the curriculum requirements and regulations of the school or college to which admission is sought. Work of low pass grade (such as D or the equivalent) will not be considered for transfer.

## ENTRANCE REQUIREMENTS\*

### THE LOWER COURSE

An acceptable certificate of graduation from an accredited secondary school, or the satisfactory passing of College Entrance Board examinations attended with the approval of the Director of Admission, is required. (See "Methods of Admission".)

*Distribution of Units for All Curricula.*—Confirmation by the principal that the student has satisfied all curriculum requirements of the school will be accepted in lieu of any prescribed distribution of units. Attention is called, however, to the necessity of accumulating stated prerequisite studies during the secondary school period for admission to certain curricula. It is to be noted that one unit of algebra is prerequisite to courses in chemistry, mathematics, physics, and statistics, and that in addition one unit of plane geometry is prerequisite to courses in mathematics and physics. In the instance of applicants who do not meet the above stated mathematical requirements, algebra and plane geometry may be taken without college credit when offered by the Department of Mathematics. For a statement of the foreign language requirements see pages 35-36.

A desirable secondary school program in preparation for college would include: four years of English, four years of foreign language (preferably one language rather than two), two years of natural or physical science with laboratory instruction (over and beyond the so-called "General Science"), two or three years of social studies (with concentration on history), and or two years of basic mathematics.

\*Curriculum requirements are established by the faculty of the several colleges, schools, and divisions. The Director of Admissions, in regard to the transfer of previously completed college and university credits, maintains and consults.

### THOMAS COLLEGE FIVE SEMESTER COURSE

#### For the Bachelor's Degree

Each year of James College work leading to the degree of Bachelor in Arts, or the Intermediate work in institutions not organized on the Intermediate-College plan, following a specified curriculum, must be equivalent to the requirements of Williams College. In addition, however, scholarship requirements for admission must be not necessarily higher than those for graduation from the James College.

*Students at American Schools in Arts degree:* Based on the first and second semester work in the James College, or the equivalent (see page 46, November).

*Students at American Schools in Arts degree:* Based on the first semester work in the James College, or the equivalent (see page 46, November).

#### For the Master's Degree

The general University degree from an accredited higher institution is required. A student must be qualified, according to the standards of the University of the Commonwealth of Massachusetts, to be admitted to the University of the Commonwealth of Massachusetts, and to be admitted to the University of the Commonwealth of Massachusetts, and to be admitted to the University of the Commonwealth of Massachusetts.

Applicants for admission may be required by the University of the Commonwealth of Massachusetts to be admitted to the University of the Commonwealth of Massachusetts.

*Master of Arts:* The student's undergraduate curriculum must have included a program of work equivalent to that of the Bachelor of Arts degree in his degree field at the University.

*Master of Science:* The student's undergraduate curriculum must have included the equivalent of the undergraduate work in the University of the Commonwealth of Massachusetts, and to be admitted to the University of the Commonwealth of Massachusetts.

#### THE UNIVERSITY COURSE

*Doctor of Philosophy:* The student must possess an advanced degree preparation for advanced study in the proposed field, as evidenced by approved Bachelor's and Master's degrees, or the equivalent, together with acceptable research quality and capacity for creative work.

#### THE SCIENCE DEGREE

*Doctor of Medicine:* A minimum of three semesters of work in the University of the Commonwealth of Massachusetts, or the equivalent, together with acceptable research quality and capacity for creative work.



hour. A semester hour represents one class hour or a minimum of two laboratory hours a week for a period of approximately sixteen weeks. A credit earned at an institution operating on the quarter system is the equivalent of two-thirds of a semester hour. Specific required courses are:

1. Chemistry as follows: (a) eight semester hours in general inorganic chemistry, of which at least four hours are laboratory work (quantitative analysis may be counted as general inorganic chemistry); (b) six or eight semester hours, the equivalent of a complete college course of organic chemistry, including laboratory work.

2. Physics, eight semester hours, of which at least two hours are laboratory work.

3. Biology, eight semester hours, of which at least four hours are laboratory work. This requirement may be satisfied by a course of eight semester hours in other general biology or zoology.

4. English composition and literature, six semester hours; the usual equivalent college course in the equivalent.

Academic ability is evaluated on the basis of general college-point index, scientific index, scope of studies, scientific interests, quality of instruction and the results of the required Medical College Admission Test. Well qualified candidates are eligible for admission after completing the usual three semester-hour requirement. However, a high percentage of students are being qualified for the study of medicine after four years of college work.

#### Advanced Standing

A student who has satisfactorily completed one or two years at any other medical school approved by the American Medical Association, and who has the necessary professional educational requirements, may be admitted on advanced standing.

#### Two Law Semesters

##### For the Degree of Bachelor of Laws and Juris Doctor

*Bachelor of Laws.*—A Bachelor of Arts or equivalent degree, an actual term completion of a first-year course in an approved college or university is required. The baccalaureate record must be of satisfactory quality and must include an acceptable distribution of credits. An applicant will not be admitted who has been an attendant at another law school and who is ineligible to enroll in that school by good standing. From the applicants, a selection will be made by the Committee on Admission.

*Juris Doctor.*—A student does not register as a candidate for the degree until his last year in the Law School. Two credits are given (2.0).

## ADVANCED STUDIES

Advanced standing toward the degree of Bachelor of Laws will be granted only for work substantially completed in other law schools which are members of the Association of American Law Schools. However, credit will not be assigned in cases of those which might be obtained in a similar period in the Law School.

Advanced standing will not be granted for law work formerly received toward the Bachelor of Arts or other non-law degree.

Advanced standing will not be granted toward earning the requirements for the degree of Juris Doctor or Master of Laws.

## For the Graduate Degrees

*Master of Laws*—A Bachelor of Arts or equivalent degree from an approved college or university and a Bachelor of Laws or equivalent degree from a member school of the Association of American Law Schools are required. Candidates for admission must have earned a B average in all work done for the Bachelor of Laws degree, except that, in the discretion of the Committee on Graduate Studies, applicants otherwise eligible need be awarded no grade of distinction and arrangement as an alternative. Advanced standing will not be granted for credits earned while a candidate for the first degree in law. Credits earned as an unclassified student will not be officially toward earning the requirements of the degree unless previous permission therefor is obtained in the form of admission.

*Master of Comparative Law and Master of Comparative Law (American Practice)*—The following are required: (1) the successful completion of and graduation from a course in arts, philosophy, history, or science, equivalent to graduation from a graduate school in law; and (2) graduation in law from a recognized foreign university whose training was in Civil Law.

*Doctor of Juris Doctor*—The following are required: a Bachelor of Arts or equivalent degree from an approved college or university and a Bachelor of Laws or equivalent degree, earned with high rank, from a member school of the Association of American Law Schools, and successfully received for scholarly work in the field of law.

## Unclassified Students

A person who is in good standing in a degree candidate in another law school, which is a member of the Association of American Law Schools

\* Candidates accepted at entry to the law school are generally from an American college giving an approved liberal education, or are admitted, after one year in the college, to the U. S. Civil Service School, which has been approved by the American Bar Association.

ment, at the discretion of the Dean, be admitted as an unclassified student on entry to earn credit for transfer to the other law school.

A person who is a member of the bar or a jurist, but a member of the bar, who is a graduate of a member school of the Association of American Law Schools may, at the discretion of the Dean, be admitted as an unclassified student.

Unclassified students participate in the work of the course and take examinations. Courses taken by unclassified students will not be credited toward degrees at this Law School.

#### Continuing Legal Education Institute

A simplified admission and registration procedure is provided for members of the bar desiring to register at continuing legal education courses on full-time basis or on a part-time basis. Members of the bar desiring to register as degree candidates or as unclassified graduate students should file the regular application for admission form.

#### THE SCHOOL OF ENGINEERING

##### For the Bachelor's Degree

*Bachelor of Civil Engineering, Bachelor of Electrical Engineering, Bachelor of Mechanical Engineering, Bachelor of Science in Engineering*—the acceptable certificate of graduation from an accredited secondary school or the satisfactory passing of College Entrance Board examinations in secondary school subjects selected with the approval of the Division of Admissions is required.

Four out of eight of the fitness tests required for entrance must be satisfied as follows: three in English, two in algebra, one in plane geometry, one both in plane trigonometry, one in algebra or chemistry, and two in one foreign language or history. A graduate of an approved high school who does not offer for admission the particular subjects required for the engineering curriculum, but who does present not less than fitness acceptable scores, may be admitted on condition of such deficiency in the distribution of tests does not exceed two units.

##### TRANSFER STUDENTS

Advanced standing may be granted for work successfully completed at accredited institutions of higher learning. Credit will be assigned by the School of Engineering to the extent that the work taken at previous institutions meets the requirements for the degree sought at this University, and subject to the general University regulations concerning satisfactory subsequent work.

## For the Master's Degree

*Master of Science in Engineering*—A Bachelor's degree in engineering from a recognized institution and previous or concurrent the graduate study are required. Admission by examination may be permitted in exceptional cases.

*Master of Engineering Administration*—A Bachelor's degree in engineering or some form of recognized institution, the evidence of the preparation and capacity for graduate study, and acceptable recommendation or recommendation are required.

## The Master of Pharmacy

## For the Bachelor's Degree

*Bachelor of Science in Pharmacy*—The student is also degree based on the curriculum in Pharmacy in the Junior College (see page 15-16), or the equivalent is required.

A student who has received a Bachelor's degree from an accredited institution or who has completed work in the general college or health-care studies of the pharmacy curriculum may be admitted to advanced standing. The more this one year or advanced standing will be granted a student from any institution other than an accredited college of pharmacy.

## For the Master's Degree

*Master of Science in Pharmacy*—A Bachelor of Science degree from an accredited institution is required. A master's period and professional practice are required.

## The Master of Education

## For the Bachelor's Degree

*Bachelor of Arts in Education, Bachelor of Science in Home Economics, Bachelor of Science in Physical Education*—The student is first degree based on the Education, Home Economics, or Physical Education curriculum in the Junior College (see page 15-16), or the equivalent from another accredited higher institution or a certificate of graduation from an approved normal school or the equivalent is required. With the exception of Home Economics students must be in possession of acceptable credits that give evidence of training as a teacher.

## For the Master's Degree

*Master of Arts in Education*—To be admitted to candidacy for the degree of Master of Arts in Education the applicant must: (1) hold a



Bachelor's degree from an accredited institution; (4) have an appropriate qualification score at entrance exam; (5) have demonstrated a genuine interest in teaching; (6) be in possession of personality traits that give promise of better-than-average success as a teacher.

He be admitted to completion of programs designed to prepare for service in guidance and administrative two years of successful teaching experience not prerequisite.

#### For the Advanced Professional Certificate

*Advanced Professional Certificate.*—The Bachelor of Arts degree in Education or the Bachelor of Science degree in Physical Education from the School of Education, or the equivalent from another institution of higher learning; a Master's degree from an accredited institution of higher learning, or least two years of successful teaching experience, and a permanent teaching or administrative license are required.

#### For the Doctor's Degree

*Doctor of Education.*—The degree of Master of Arts in Education, or the equivalent, and at least three years of satisfactory educational experience are required.

#### For Schools of Government

##### For the Bachelor's Degree

*Bachelor of Arts in Government.*—An Associate in Arts degree based on the Foreign Affairs, Public Affairs, Government, Business Administration, or Business and Economic Statistics curriculum in the Junior College (see page 50-51), or the equivalent is required.

##### For the Master's Degree

A Bachelor's degree from an accredited college or university is required. A student from an unaccredited institution may be admitted on the discretion of the Committee on Admission and Advanced Standing, but will be required to take such extra work where the minimum requirements as may be prescribed.

A student admitted to graduate work must have attained a qualification index of 1.00 (1.0 average) in six undergraduate courses. An applicant whose cumulative average is below 1.00 in his studies, or who lacks prerequisite courses, may be referred to the Division of Special Students to make up the deficiency.

*Master of Arts in Government.*—The university's undergraduate program must have satisfied previously stated requirements to an undergraduate master at this University, and the thesis field of graduate study.

*Master of Arts in Public Administration.*—An undergraduate master in a social science or equivalent work equivalent of master's.

*Master of Arts in Personal Administration.*—An undergraduate master in a social science or education with the permission of the faculty of sociology is granted.

*Master of Business Administration.*—An undergraduate master in Business Administration, as the Department of Business Administration, will be defined as full master work may be admitted and will be required to work up dissertation work and pass the current Master of Business Administration program.

#### For the Doctor's Degree

*Doctor of Business Administration.*—A Master's degree in Business Administration at a school level of the university, and permission to continue past accounting in the activities of the Committee on Doctoral Studies are required.

#### THE CHAIRS OF GEORGE WASHINGTON

For admission to the College of George Washington, see rules.

#### THE DIVISION OF UNIVERSITY STUDENTS

Students of each of age or over that are not licensed to teaching for a degree in this University must be considered for admission to the Division of University Students in the manner for which they have been previously admitted, as outlined by previous admission rules.

Students under 21 years of age who are the primary responsibility of the Dean of the College but who are not meeting requirements at this University may be admitted to the Division of University Students in certain programs of study approved by the Dean.

In special instances with the permission of the university, a student may be considered for admission as an exchange student without being required to have either part of the University or its own requirements. But in such a case the student must be well recommended.

#### THE DIVISION OF SOCIAL STUDIES

This is a new department, division of the University in which the Division of Administration will influence the development of studies in the

process of making up entrance requirements to degree-granting colleges and schools of the University.

Complete credentials must be submitted and evaluated before a tentative or definite plan of admission may be prepared.

#### THE DIVISION OF AIR SCIENCE

The applicant must be a regularly enrolled, full-time student; at least fourteen years of age; a citizen of the United States; physically fit; of good character; and a candidate for a Bachelor's degree.

#### CLASSIFICATION OF STUDENTS

*Regular Students.*—Regular students are those who have met the entrance requirements for candidacy and are registered for degrees.

*University Students.*—Persons not seeking degrees, as specified in the rules of the Division of University Students, may be admitted to this Division to pursue courses for which they have had adequate preparation.

*Special Students.*—Special students are those who are in the process of qualifying for admission to research in degree-granting colleges and schools of this University.

Additional information concerning curricula, courses offered, entrance requirements, an admission procedure may be obtained from the Office of the Director of Admission.

## REGISTRATION

Before a student may be admitted to registration he must have received the Order of the Director of Admissions that he is entitled to enter the University (see "Admission", pages 13-41).

A student who has previously matriculated in the University, but who has not filed an application during the semester prior to registration, should file an application for matriculation in advance of registration.

Registration is for the semester unless otherwise indicated in the registration paper. No registration is accepted for less than 3 semesters or for longer periods.

A student may not register continuously in The George Washington University and another institution without the permission of the dean of the college, school, or division in which he is registered in The George Washington University. Attempts of course for work done continuously will be at the discretion of the appropriate Committee on Admissions and Advanced Standing.

### Time and Place of Registration

Registration for all colleges, schools and divisions occurs at noon daily in Building 11, room 11-1000 SW, between 9:00 a.m. and 5:00 p.m., during the following periods: Fall semester, September 14-15 and 16-17; Spring semester, January 29 and 30.

For the Law School: Division Hall, 1000 Connecticut Avenue NW, between 9:00 a.m. and 5:00 p.m.; Fall semester, November 18 and 19; Spring semester, January 29 and 30.

For the School of Medicine: School of Medicine, 1115 H Street NW, between 9:00 a.m. and 5:00 p.m.; September 22.

For the College of General Studies: at noon and eleven o'clock, September 14, 15 and 16.

### Registration Through Last Semester

The registration governing transfer is continuous and withdrawal on pages 45, 46 and 47.



## FEES AND FINANCIAL REGULATIONS

On recommendation of the Board of Trustees, the following has been adopted effective September 1, 1997:

Type: 

For each meeting held* by visiting scholars, including James for work in the Laboratory for research in Department of Engineering, in the School of Engineering, for service in the School of Chemical Engineering, the work under a Master's degree in Engineering, and for each other for a certificate in a Doctor's degree.	\$1500
For each meeting held by visiting the visiting scholars in the Laboratory	\$1000
For each meeting held by visiting the visiting scholars for research in Department of Engineering, in the School of Engineering.	\$1000
For the work in School of Engineering, for each meeting.	\$1000
For the degree in School of Engineering, School of Engineering, in Department of Engineering.	
For each meeting held by visiting the visiting scholars in School of Engineering.	\$1000
For each meeting held by visiting the visiting scholars in School of Engineering in School of Engineering.	\$1000
For each meeting held by visiting the visiting scholars in School of Engineering in School of Engineering.	\$1000
For the degree in School of Engineering in School of Engineering.	\$1000
For each meeting held by visiting the visiting scholars in School of Engineering in School of Engineering.	\$1000

As several services were not taken such as laboratory and recording fees are charged as indicated in the special equipment. Other fees are charged in the amounts with which following facilities may be delivered in three payments when the balance is paid in full. **Recharge of batteries** is charged against the telephone number. When recharge is in excess of the balance amount provided for in the laboratory fee the additional amount will be required to pay such additional charges as are indicated by the telephone number.

\* Because of space in a *Waste* I have written also previously, I bring the attention of my readers to the notes and letters at the end of the book, which show the work of the writers. In one of these I attempted to indicate some points that may be of interest to those who are interested in the work of the writers. I have written also a note on the work of the writers, which is of interest to those who are interested in the work of the writers. I have written also a note on the work of the writers, which is of interest to those who are interested in the work of the writers.

1. Beginning in the third of October, a fee is paid of two pence. With the arrival of winter, the price of fuel rises, so a charge for the day when the weather is cold. The rest of the money will be returned upon receipt of a receipt of the same.

1. When a student graduate a course must provide for this in subsequent all the questions of

General Fee	
When the degree of Bachelor of Arts is awarded to Student A.	1000
When a degree is awarded to Student B.	1000
When an Advanced Postgraduate Certificate in Education is awarded.	1000
For the Student Monthly Tuition.	100
For the Postgraduate Tuition for each hour of instruction.	100
For the Tuition for each hour of instruction.	100
Library Fee	
Students who attend the University for a period of one year.	100
Students who attend the University for a period of two years.	200
Students who attend the University for a period of three years.	300
Students who attend the University for a period of four years.	400
Students who attend the University for a period of five years.	500
Students who attend the University for a period of six years.	600
Students who attend the University for a period of seven years.	700
Students who attend the University for a period of eight years.	800
Students who attend the University for a period of nine years.	900
Students who attend the University for a period of ten years.	1000
Students who attend the University for a period of eleven years.	1100
Students who attend the University for a period of twelve years.	1200
Students who attend the University for a period of thirteen years.	1300
Students who attend the University for a period of fourteen years.	1400
Students who attend the University for a period of fifteen years.	1500
Students who attend the University for a period of sixteen years.	1600
Students who attend the University for a period of seventeen years.	1700
Students who attend the University for a period of eighteen years.	1800
Students who attend the University for a period of nineteen years.	1900
Students who attend the University for a period of twenty years.	2000
Students who attend the University for a period of twenty-one years.	2100
Students who attend the University for a period of twenty-two years.	2200
Students who attend the University for a period of twenty-three years.	2300
Students who attend the University for a period of twenty-four years.	2400
Students who attend the University for a period of twenty-five years.	2500
Students who attend the University for a period of twenty-six years.	2600
Students who attend the University for a period of twenty-seven years.	2700
Students who attend the University for a period of twenty-eight years.	2800
Students who attend the University for a period of twenty-nine years.	2900
Students who attend the University for a period of thirty years.	3000
Students who attend the University for a period of thirty-one years.	3100
Students who attend the University for a period of thirty-two years.	3200
Students who attend the University for a period of thirty-three years.	3300
Students who attend the University for a period of thirty-four years.	3400
Students who attend the University for a period of thirty-five years.	3500
Students who attend the University for a period of thirty-six years.	3600
Students who attend the University for a period of thirty-seven years.	3700
Students who attend the University for a period of thirty-eight years.	3800
Students who attend the University for a period of thirty-nine years.	3900
Students who attend the University for a period of forty years.	4000
Students who attend the University for a period of forty-one years.	4100
Students who attend the University for a period of forty-two years.	4200
Students who attend the University for a period of forty-three years.	4300
Students who attend the University for a period of forty-four years.	4400
Students who attend the University for a period of forty-five years.	4500
Students who attend the University for a period of forty-six years.	4600
Students who attend the University for a period of forty-seven years.	4700
Students who attend the University for a period of forty-eight years.	4800
Students who attend the University for a period of forty-nine years.	4900
Students who attend the University for a period of fifty years.	5000

Registration by the University entitles each student to the following University privileges: (1) the loaning of one certified transcript of record if and when desired; (2) the services of the Placement Office; (3) the use of University Library facilities, except as otherwise designated; (4) government privileges; (5) admission to all athletic events unless otherwise specified; (6) subscription to the *University Herald*, the student newspaper; (7) admission to University debates; (8) medical attention and hospitalization as described under Health Administration, pages 113-14. These privileges, with the exception of the loaning of transcripts, transcripts, and a student is no longer in evidence, when he withdraws or is dismissed from the University.

#### PAYMENT OF FEES

All fees are payable to the Office of the Treasurer, 713 Treasury Loan House, NW. The student is permitted to complete registration or to attend classes with all fees in paid. Fees for each semester are due and payable in advance at the time of registration.

In exceptional cases, subject to the approval of the Treasurer, the student may sign a contract for semester charges, except for fees payable in advance, extending payments as follows:

**Full Tuition**—One-third at the time of registration, recorded on November 2, recorded on December 2.

**Spring Tuition**—One-third at the time of registration, recorded on March 1; recorded on April 1.

Arrangements for the above may be made with the Office of the Cashier at the time of registration.

A student who fails to make payments when due, but who pays his fees from the fourth to the fifteenth, inclusive, of the month in which payment is due, is charged a service fee of \$5. A student who fails to make payments by the fifteenth of the month in which payment is due will be automatically suspended and may not attend classes until he has been officially reinstated and has paid all accrued fees and a reinstatement fee of \$5.

A student suspended for failure to make payments when due may not be reinstated but the semester will run until the date of suspension. Applications for reinstatement are to be made to the Office of the Cashier.

As within year all fees chargeable to the student registered for credit toward the two-semester fee.

#### WITHDRAWAL AND REFUNDS

Applications for withdrawal from the University at any stage in class schedule must be made in person or in writing to the Dean of the college.

school, or session in which the student is registered. Notification to an institution is not an automatic action. Use "Withdrawal", never quit.

To understand withdrawals and changes in institution, financial aid, loans will be made as follows:

**Fall Session:** Withdrawal dated on or before October 31, resulting in withdrawal from charges; withdrawal dated on or before November 30, resulting in withdrawal from charges. No refund of tuition will be issued on a withdrawal dated subsequent to November 30.

**Spring Session:** Withdrawal dated on or before February 28, resulting in withdrawal from charges; withdrawal dated on or before March 31, resulting in withdrawal from charges. No refund of tuition will be issued on a withdrawal dated subsequent to March 31.

To see how well a school is able to do the best part of the withdrawal charges within the requirement is by offering and by receiving before the regular requirement fee. In this case a withdrawal fee of \$10 is charged and tuition fees refunded. There are still tuition fees refunded on withdrawal from charges, such as:

Tuition refund only to the student, by which a requirement charge is received and at which the student is entitled to receive payment.

Any student in charge of withdrawal who fails to check out of the institution on or before the first day of the semester, unless advised by the institution, will be charged a withdrawal fee of the amount of \$10. A student who fails to check out of the institution must check out of the institution in the first week of the semester.

Any student enrolled in the Air Force ROTC who fails to meet the military requirement will forfeit an institution from the United States and be charged the value of the military fee.

Authoritative withdrawal and notification for each school will not be given a student who has not a clear financial record.



## FELLOWSHIPS, SCHOLARSHIPS, PRIZES, FINANCIAL AID

### FELLOWSHIPS AND GRADUATE ASSISTANSHIPS

The following fellowships and graduate assistantships are available. Unless otherwise specified, applications should be submitted not later than April 1 preceding the period for which the award is to be made.

*University Teaching Fellowships.*—These are awarded for the academic year to the various departments of instruction. The applicant is expected to be a prospective candidate for a Doctoral degree, and to have a Master's degree or equivalent in the general field of his future doctoral work. Each Teaching Fellow receives an annual stipend for a nine-month period of up to \$1,500 plus full tuition for whatever schedule of study or research he follows during period his tenure. It usually goes with the work load of the individual Teaching Fellow. Normally a University Teaching Fellow receives full-time service as classroom or laboratory assistant in the department of instruction during his doctoral study. Applications should be made to the executive officer of the department of instruction concerned.

*Graduate Teaching Assistantships.*—These are given in various departments of instruction to candidates for the Master's degree. Each graduate assisting assistant receives a designated rate of service in the major department of instruction, and receives, depending upon his training or laboratory assignment, up to \$1,215 in a nine-month period plus tuition for the program of studies which the status of his assistantship permits him to carry. Applications should be made to the executive officer of the department of instruction concerned.

*Law School Research Assistantships.*—Students seeking assistantships are available each year to students currently enrolled in the Law School, preference being given to applicants who are completing their second year. Each assistant receives an annual stipend. Awards are made on the basis of academic standing, financial need, and interest in leadership. Research assistant have duties similar to those of teaching fellows. Applications should be submitted to the Dean of the Law School not later than May 1.

*Law School Teaching Fellowships.*—Teaching fellowships are available each year in the Law School to prospective candidates for the Master of Laws degree. Each fellow receives an annual stipend, plus tuition for the academic year. Teaching fellows follow an approved program of study and research under mentors of the Faculty in the fields of law—criminal, civil, and marriage studies, work in legal



the academic year for which the scholarship is to be awarded. Further information may be obtained from the Chairman of the Committee on Scholarships.

**Alpha Epsilon Omega Scholarship.**—This scholarship, in the amount of \$500, was established by Pi Chapter of Alpha Epsilon Omega Pharmaceutical Fraternity. It is awarded annually to a member of the graduating class of one of the public high schools of the District of Columbia and nearby Maryland and Virginia who intends to enroll in the Junior College Pharmacy Curriculum and to continue in the School of Pharmacy, completing the work leading to the degree of Bachelor of Science in Pharmacy.

**Clayton E. Amersbach.**—Five scholarships are available each year to the Junior College, from the recommendation of regional alumni clubs to outstanding men graduating from accredited high schools. The scholarships cover tuition costs for four semesters (beginning with the fall semester) of full-time work, but do not include annual fees such as laboratory charges, room, board, or other expenses. To receive the scholarship, the student must maintain a B average. Additional information may be obtained from the Director of Alumni Education.

**American Foundation for Pharmaceutical Education Scholarship.**—A scholarship fund, in the amount of \$200, established by the American Foundation for Pharmaceutical Education, is available annually to honor and assist students at the School of Pharmacy who are in the upper portion of their class or who are maintaining average grades of not less than B. The scholarship funds are awarded on the recommendation of the Committee on Scholarships of the School of Pharmacy.

**American Society of Women Accountants.**—This scholarship, in the amount of \$500, established in 1921 by the District of Columbia Chapter of the American Society of Women Accountants, is available to a sophomore, junior, senior, or postgraduate woman majoring in accountancy whose accounts credit to good and able work and be pursuing her education.

**Bessie Andrews Scholarship.**—This scholarship, in the amount of \$500, established in 1926 by Miss Belle Fisk Andrews in memory of her husband, Bessie Andrews, is available "for students and study expenses, who show an proven aptness in English, Latin, journalism, history, literature, or political science."

**Anna Barrack Scholarship.**—This scholarship, in the amount of \$500, established in 1926 by Dr. Anna Barrack-Dunne, as a memorial to her mother, Anna Barrack, is available as a woman in the School of Medicine "of outstanding scholarship, character, and promise, who intends to make the practice of medicine her life's profession." The award is made upon the recommendation of the Faculty of the School of Medicine.

**Everett Cassatt Druey Scholarship.**—This scholarship, in the amount

of Arts, established in 1894 by bequest of Alice E. H. Brainer in memory of her son, Vincent Lester Brainer, is available to students in the School of Medicine.

*Anna E. Case Scholarship.*—This scholarship is the subject of \$200 each made out of \$500 each, established in 1894 by Mrs. Anna E. Case, now available to young men in the college ranks for distinguished preparation work, including discussion, reports, and work.

*Henry Harding Carter Scholarship.*—This scholarship, in the amount of \$200, established by gift by Mrs. Maria M. Carter in memory of her son, Henry Harding Carter, is available to a deserving student who is preparing for the engineering profession.

*Mary M. Carter Scholarship.*—This scholarship, in the amount of \$200, established in 1894 by Mrs. Maria M. Carter, is available to a deserving student.

*W. Howard James Freeman Scholarship.*—This scholarship, in the amount of \$200, established in 1894 by the Washington, D. C., The Howard James Freeman, is available annually to a student who shows promise in work presented and who is in need of financial assistance in order to continue his advanced study.

*President of the American Evangelical Education.*—This scholarship, in the amount of \$200, established in 1894 by the President of the American Evangelical Education, is available to students in Latin and Greek studies who are demonstrating promising results, of interest to the American Evangelical.

*Low Durr Scholarship.*—This scholarship, in the amount of \$200, was established in 1894 by the Massachusetts State of Massachusetts, in memory of the scholarship and bequest "to the student in the most good scholarship." It was in fact established in 1894, the scholarship is now awarded by the University.

*Smith College Pharmaceutical Science Scholarship.*—This scholarship, in the amount of \$200, was established in 1894. It is awarded annually to a student of the pharmacy class or out of the pharmacy school with which it is connected at the University of California and Smith College, who shows promise in the study of Pharmacy, Chemistry and is entitled to the School of Pharmacy, continuing the work during the period of studies in Smith College.

*Albany Pharmacy House Memorial Scholarship.*—This scholarship, established in 1894 in a bequest to Charles Washington Dwyer, Director of Labor, St. Albans, is available to the student who is pursuing study in the University of the Law School, to a wide and promising graduate in Columbia College or other department of the University, with a knowledge of Latin or other equivalent degree, who has completed an average of 80 or an undergraduate student and who shows promise in the



unit of law as a full-time student. The scholarship covers tuition for the course leading to the first degree from the Law School, Bachelor of Laws or Juris Doctor, provided that the holder maintains an average of B. The right is reserved to suspend the holding of the scholarship for want of use there. This scholarship is awarded annually once every three years.

*School of Engineering Scholarship.*—Four scholarships are available each year in the School of Engineering to graduates of accredited secondary schools. The holders of these scholarships must cover a full program in the School of Engineering.

Each scholarship is a full-time scholarship but does not cover special fees. Each scholarship is for four academic years (summer work is not to be included), provided the holder thereof meets all academic and other standards of the University.

To retain a School of Engineering scholarship on average of B and a satisfactory record of department must be maintained. In case a student receives after the award is made, the scholarship is forfeited. If the student receives a holder of a School of Engineering scholarship engages in a foreign tour and scholarship the scholarship remains unfilled.

*Henry Purpus Erwin Scholarship.*—This scholarship, in the amount of \$500, established in 1927 by Mrs. Helen B. Erwin as a memorial to her husband, Henry Purpus Erwin, a former Trustee of the University, is available for a student in Engineering.

*Robert Fairbank Dickinson.*—This scholarship, in the amount of \$500 given to the University in 1921 by Mrs. Robert Fairbank, is available to a student in Columbia College.

*General Motors College Scholarship.*—This scholarship, established in 1925 by General Motors Corporation, is available for an incoming freshmen student who is a citizen of the United States and demonstrates outstanding talent, high personal qualifications, and financial need. The amount of the award has been made flexible and will range from ten thousand to \$25,000, up to an award of \$25,000 per year, depending upon the demonstrated need of the individual. It is renewable for the four years of undergraduate work provided the student maintains at least the high standards established by the holder of this award.

*June Spicker Hanzel Scholarship.*—This scholarship, in the amount of \$400, established in 1920 by Mrs. Evelyn Hanzel Young, is available for scholarship aid to young married women students in the School of Education in Columbia College.

*Eliza Lewis Harvey Scholarship.*—This scholarship of \$500 was founded in 1921 by Mrs. Eliza Elizabeth Harvey as memorial to her daughter, and is awarded every four years, or as often as vacant, to a young woman in Columbia College of the Protestant faith and the

Overseas men who shall be selected for similarities and annual qualifications.

*Updegrave Scholarship.*—This scholarship, in the amount of \$1000 established in 1901 by the bequest of Little E. Updegrave, is reserved annually "for the use and maintenance of study and useful education."

*High School Scholarships.*—The Board of Trustees of the University offers thirty-two scholarships to graduates of public high schools in the District of Columbia, Maryland, New Jersey, in the District of Columbia city, two each in the Maryland, Prince Georges, Arlington and Fairfax areas, and two in the Alexandria city area, the home city of General George Washington. Scholarships are divided equally between men and women. One of the District of Columbia scholarships, designated as the *James W. Smith Scholarship*, was established in 1894 by the late Honorable James Smith.

Each scholarship is awarded annually to a member of the graduating class who plans to enroll in the Junior College for the freshman and sophomore years and thereafter in Columbian College or any one of the professional schools announcing a constitutional correspondence in the Junior College. The scholar must register the following semester with every such university a full academic program as prescribed in the Junior College syllabus or in the college or school to which he desires to enter directly next; he must be in the college or school to which he desires to enter directly next semester.

Each scholarship is a full tuition scholarship but does not cover board and room. Each scholarship is for four academic years (summer term is not to be included), provided the holder does not reach all a master's and other students of the University.

To obtain a high school scholarship, an average of B and a satisfactory record of attendance must be maintained. In case a student receives more than one award in such, the scholarship is forfeited. If for any reason a holder of a high school scholarship ceases to be deemed bona fide student, the scholarship money will be lost.

*High School Discussion Conference Scholarships.*—Three scholarships are awarded each year to the Junior College to high school seniors who participate in the George Washington University High School Discussion Program. These scholarships were instituted in 1921, but in that school year they were not awarded. For information concerning application, consult the Department of Study.

*Kappa Alpha Theta Scholarship.*—This scholarship, in the amount of \$500, established by the Washington chapter of Kappa Alpha Theta, is available for the training of a theme in speech oration.

*Kappa Psi Scholarship.*—This scholarship, in the amount of \$1500, was established in 1920 by Gamma Tau Chapter of Kappa Psi Pharmacy.

and President. It is awarded annually to a student in the School of Pharmacy who is in need of financial aid.

*Law School Scholarships.*—Scholarships are available each year in the Law School to graduates of accredited colleges. Each scholarship provides full three-year tuition in the morning division of the Law School. Candidates must have graduated in the upper fifth of their class and must have demonstrated qualities of leadership in addition to scholastic attainment. To receive the scholarship, the successful candidate must maintain a B average. Applications must be made before March 1 to the Dean of the Law School.

*Eugene and Agnes E. Meyer Scholarships.*—A scholarship fund, in the amount of \$4,000, established in 1952 by the Eugene and Agnes E. Meyer Foundation, is available annually "to assist promising students or applicants in meeting the costs of furthering their education, with professional consideration to children of persons who are employed in public service including service in the armed forces of the military."

*J. Mendenhall Scholarship.*—This scholarship was established by Mr. J. Mendenhall in 1951. It carries an annual stipend of \$200, which is available for an undergraduate intending to enter the Christian ministry.

*The National League of Mothers' Club Scholarship.*—This scholarship, in the amount of \$200 annually to be applied toward payment of tuition and only, is offered by the National League of Mothers' Clubs. It is awarded every four years, or as often as vacant, to the son or daughter of a Mother's Club who is a member of a Mothers' Club affiliated with the National League of Mothers' Clubs. To receive to hold this scholarship, the student must maintain a satisfactory scholastic record.

*Newspaper Scholarships.*—One scholarship is available each year to a candidate recommended by each of the following newspapers: *The Washington Daily News*, *The Washington Post and Times Herald*, and *The Evening Star*. The holder of the scholarship must be an employee of the newspaper. These scholarships are valid for four school years, provided the holder continues in the industry and is recommended by the newspaper, and maintains a satisfactory academic record and a high standard of deportment. They cover tuition but do not include laboratory fees, graduation fees, or other school fees.

*Psychiatric Association of Washington, D. C., Scholarship.*—A scholarship, in the amount of \$200 to be applied to tuition fees, has been established by the Psychiatric Association of Washington, D. C. This scholarship is available annually to a woman student in her sophomore or junior year, who is a member of a National Psychiatric Conference session, and whose aim is to promote good social relations among the



operation on the campus is an outstanding leader in student affairs sponsored by the University, and has a lot (81) of better things.

**Paul Francis Scholastic.**—This scholarship, in the amount of \$200, established in 1921 by bequest of Paul Francis and "to be known as the 'The Paul Francis Award', is awarded to a student in the School of Pharmacy, upon the recommendation of the Faculty of that School.

**The Delta Gamma Scholarship.**—This scholarship, established in 1921 by Delta Chapter of The Delta Gamma, in the amount of \$100, is awarded annually to a woman who is a candidate for an advanced degree at the University.

**Lula O. Foster Scholarship.**—This scholarship, established in October 1922, by bequest of Mr. Foster's father to the University, is to be awarded to a student of Forsyth County, Georgia, upon the recommendation of the Carthageville Rotary Club and the Hapt Union Club in this County. The scholarship covers tuition costs for the first year of instruction in Foreign Affairs, but it does not include laboratory fees, graduation fees, or other special fees. To retain the scholarship, the student must carry a full program and maintain an average of B. The scholarship is awarded every two years or as often as possible. Further information may be obtained from the Office of the President of the University.

**July 22. Hyster Scholarship.**—This scholarship, in the amount of \$100 and \$200, respectively, established in 1923 by bequest of Julia M. Hyster, and awarded to "female Freshman students, living in one of the Foreign Service Dormitories in the Student Government."

**Samuel Brown Scholarship.**—This scholarship, in the amount of \$100, established in 1923 by Miss Louise J. Brown, is awarded to the senior student.

**May Daniel Jones Scholarship.**—This annual scholarship, in the amount of \$100, established in 1923, is awarded to a young woman at senior's College College.

**Charles Hester Jones Scholarship.**—These scholarships, in the amount of \$100 and \$200 respectively, established in 1923 by President Charles Hester Jones, are awarded to the student who is a graduate of the University of Georgia.

**Thomas Hester Jones.**—This scholarship, established in 1923 by the Thomas Hester Jones, covers tuition, fees, and expenses and is awarded annually to a young man entering the University who is a member of the National Student Council and who is a member of the University of Georgia. It is awarded for the first year of undergraduate study provided the student maintains that standard of scholarship and attendance.

**William Walker Scholarship.**—This scholarship, established in 1923 by William Walker, Esq., covers an annual award of \$100 which is given to the student who is a member of the Christian Union.



*John H. Wainwright Scholarship*.—This scholarship of \$100 was established in 1916 by the New York Baptist Theological Seminary.

*W. Louis Fenderson Scholarships in the Field of Foreign Affairs*.—Scholarships, awarded by the W. Louis Fenderson Scholarship Foundation of High Twelve International, Inc., are available to graduates of accredited colleges who wish to enroll in the School of Government for graduate work in foreign affairs. Preference is given to students who themselves are affiliated with, or whose parents are affiliated with, High Twelve International or the Mission Order. The scholarships cover tuition for one year of graduate study in residence.

*Ellis H. Washburn Scholarship*.—This scholarship of \$25, established by Ellis H. E. Washburn, is available to a student in Columbian College.

*The Zonta Club of Washington, D. C., Scholarship*.—This scholarship, in the amount of \$100, offered by the Zonta Club of Washington, D. C., is available to a woman who is a student of graduate studies with special interest in a professional or business career.

#### THE COLUMBIAN WOMEN SCHOLARSHIP FUNDS

The Columbian Women Scholarships are awarded to women students by the Scholarship Committee of Columbian Women. The awards are based on financial need and scholastic attainment. Applications for these scholarships should be addressed to the Chairman of the Scholarship Committee, Columbian Women, The George Washington University, Washington 6, D. C., not later than May 15 for the Fall semester, and not later than January 1 for the Spring semester.

*Mrs. Maynard Knapp Scholarship Fund*.—The income from this fund of \$1,000, established in 1913 in memory of a former president, Mrs. Maynard A. Knapp, is available for scholarships for women.

*Presidency of Columbian Women Scholarship Fund*.—The income from this fund of \$1,000, established in 1900, is available for scholarships.

*Julius Young Harris Scholarship Fund*.—The income from this fund of \$1,000, established in 1925 and named in 1929 in memory of a former president, is available for scholarships.

*Elizabeth F. Brown Scholarship Fund*.—This fund of \$1,000 was established in 1913 by the College Women's Club of Washington, D. C., in memory of the late Elizabeth F. Brown. The income is available for a scholarship for a woman student in the School of Education.

*College Women's Scholarship Fund*.—The income from this fund of \$1,000, established in 1926 by the College Women's Club of Washington, D. C., is available for scholarship aid.

*Lowell D. and Myrtle H. Wilson Memorial Scholarship Fund*.—This fund of \$1,000 was established by Miss Elizabeth Wilson in 1926 as a memorial to her parents, Lowell D. and Myrtle H. Wilson. The income is available for a scholarship in the School of Medicine.

*Oliver Ross Chubbuck Scholarship Fund*—The income from the fund is given annually to the student of a former graduate in medicine for scholarship aid.

*Samuel McDowell Scholarship Fund*—The income from this fund is given annually to the student of a former graduate in medicine for scholarship aid.

*First Love Health Foundation Scholarship Fund*—The income from this fund is given annually to the student of a former graduate in medicine for scholarship aid.

# 1922

*Alpha Chi Sigma Chapter*—Alpha Chi Chapter of Alpha Chi Sigma Fraternity offers annually the following prizes:

A "Handbook on Chemistry and Physics" is awarded to each of the three students who score at first written entrance exams during the entrance year and attain the highest average in subsequent semesters.

The winner and two of preference of the student who has received the highest average score in entrance to chemistry will be awarded one or more prizes. The winner must have had at least seven hours of chemistry including the first semester at The George Washington University.

*Alpha Delta Pi Chapter*—Alpha Delta Pi Chapter of Alpha Delta Pi Fraternity offers an annual prize of \$50 to the woman member of the fraternity with the most outstanding record in scholarship, extra-curricular activities, and service to the University.

*Alpha Rho Phi Chapter*—Alpha Rho Phi Chapter of Alpha Rho Phi Fraternity awards annually a prize to the male member who has completed many summer hours at The George Washington University and has attained the highest average grade in economics, business administration, public accounting, public finance, and foreign commerce. The name of the winner and the sum of the award will be engraved on a plaque in the office of the Dean of the School of Commerce.

*Alpha Phi Omega Chapter*—The Ladies' Auxiliary, Alpha Phi Omega Chapter of the American Pharmaceutical Fraternity offers annually a copy of *The United States Dispensary* to the student student in pharmacy who has completed at least three semester hours in the University and who has earned the highest average in her course.

*American Institute of Chemistry Prize*—The District of Columbia Chapter of the American Institute of Chemistry offers an annual prize of \$100 to the male member of the American Institute of Chemistry who has completed at least seven semester hours in the University and who has earned the highest average in his course.

*First Thurstall James Memorial Prize*—This prize of \$50 is awarded to the student member of chemistry who shows the greatest proficiency

is organic causality, as evidenced by a morphological examination, and who possess such qualifications of mind, character, and personality as to give promise of future achievement.

*Martin L. Cannon Memorial Prize.*—Phi Chapter of the Alpha Zeta Omega Pharmaceutical Fraternity offers annually a copy of *The United States Dispensary*, in memory of Dr. Martin L. Cannon, in the student of pharmacy receiving his Associate in Arts degree, who throughout his college time obtained the highest grades and at the same time contributed most to the public activities in the School of Pharmacy.

*Cu Omega Prize.*—Phi Alpha Chapter of Cu Omega Fraternity offers annually a prize of \$25 to be awarded to the woman student in the graduating class with the highest record in the following special sciences: zoology, botany, political science, and history; combined with general excellence.

*John Henry Cowles Prize.*—Three prizes, founded in 1922 by John H. Cowles, Grand Commissioner of the Supreme Council of the Thirty-first Degree, Master Council of the World of the Ancient and Accepted Scottish Rite of Freemasonry, Southern Jurisdiction of the United States of America, are awarded annually to the best two students in the senior class of the School of Government. The prizes are in addition: first prize, \$100; second prize, \$50.

*DeWitt Clinton Cowen Prize.*—This prize of \$25, established by the late President DeWitt Clinton Cowen, is awarded annually to the undergraduate student who at a number of one of the University courses in literature or in government in University literature schools or the English Department has the best essay on themes of the themes.

*E. E. Carter Prize.*—The E. E. Carter Prize in English was established by the late Marvin Kendall Carter "in recognition of the study of English." The annual prize of \$50 is awarded to the member of the graduating class whose record in English, combined with general excellence, shows most marked aptitude for and attainment in English studies.

*Lowell Davis Prize.*—Three prizes, established by the Honorable Isaac Davis, of Massachusetts, in 1827, are awarded annually to such members of the senior class as shall have made the greatest progress in public speaking during their connection with the University. The prizes are as follows: first prize, \$25; second prize, \$15; third prize, \$10.

The award of these three prizes is determined by a public-speaking contest in which the participants deliver original orations. Only members of the senior class who are candidates for the degree of Bachelor of Arts or Bachelor of Science are eligible to compete.

*Doris Gorman Prize.*—Beta Beta Chapter of Delta Gamma Fraternity offers annually a prize of \$25 to the woman member of the freshman class who at the end of that year has the most noteworthy record in scholastic, extra-curricular activities, and service to the University.



*Class Latin Prose*—*Class Latin Sentence* where usually a prize of \$10 is awarded to the student possessing the highest average in *Latin* 1-4.

*Elizbeth Prize*—The *Elizbeth Prize* is first established by the late Mr. William Henry, is awarded to the student doing the best work in recitation of *Young Latin Prose*.

*Class French*—The *Class French* of first recitation by the *French* House, House of *French*, *English*, is awarded annually to the student having the highest average in his most advanced course in the *French* language and literature.

*Class Political Science*—*Class Science*—The annual prize of \$10, established in 1871 by the late Helen Tracy, is awarded annually to a student who has given promise of special ability and ability in "scientific research" in natural philosophy and/or under the jurisdiction of the Department of *Science*. The subject of the research will be sent by a committee composed of the President of the University and two members of the Faculty.

*Andrew Ross III Prize in the Political and Social Sciences*—This annual prize of \$10, established in 1888 by the late Andrew Ross III, is awarded annually to the student in the graduating class of The Great Westmoreland University, "who has demonstrated his special ability in the social and natural sciences and who has given promise of an achievement in that field in good standing during his college life." The prizewinner, the recipient will be made by the President of the University and a committee from the Faculty of the Department of Social Science.

*William H. Cook Prize*—The *William H. Cook Prize* of \$10, established in 1881 by James H. Cook in memory of his son, is awarded annually to a senior student who has done exceptionally well in chemistry.

*Miss Douglas Goodrich Prize*—The prize of \$10 was established in 1881 by Frederick Joseph Goodrich of Georgetown, D. C., in memory of Alice Douglas Goodrich, who is awarded annually to the senior student making the highest average in *French* literature.

*Edward Livingston Goodrich Prize*—This prize of \$10 was established in 1881 by Mary Williamson Goodrich, Alice Douglas Goodrich, and Frederick Joseph Goodrich, of Georgetown, D. C., in memory of Edward Livingston Goodrich, then of W. and is awarded to the senior or senior student making the highest average in the *French* language and literature.

*James Douglas Goodrich Prize*—This prize of \$10 was established in 1881 by Mary Williamson Goodrich, Alice Douglas Goodrich, and Frederick Joseph Goodrich, of Georgetown, D. C., in memory of James Douglas Goodrich, then of W. and is awarded to the senior student making the highest average in chemistry.

*Margaret Williamson Goodrich Prize*—This prize of \$10 was established



lated in 1905 by Mary Williamson Goodhart, Alice Douglas Goodhart, and Frederick Joseph Goodhart of Georgetown, D. C., in honor of Margaret Richardson Goodhart, and is awarded to the female ex aequo student making the highest average in the following fields: natural history, natural administration, human sciences, and public accounting.

*Andrew G. Hubbard Memorial Prize in United States History.*—This prize in 1905 was established by Mrs. Gertrude M. Hubbard in memory of her husband, the late Charles G. Hubbard, and is awarded annually to the member of the graduating class achieving its history who has obtained the highest standing in courses in United States history.

*Emma Evans Gannon Prize.*—Rogers Kappa Gamma Society offers annually a prize of \$25 to the following freshmen who achieve the best record in Roman 1 and 2.

*John Bell Loomis Prize.*—This prize, established by the bequest of John Bell Loomis, consists of a medal which is awarded annually to the member of the graduating class in the Law School who attains the highest average grade in the entire course for the degree of Bachelor of Laws or Juris Doctor.

*Martin Mathis Prize in Materials Practice.*—This prize established in 1904 by Martin Mathis consists of a monetary honorarium in the American Institute for Testing Materials and is awarded to the senior student in graduate studies in engineering who exhibits the best reports on work in the Materials Laboratory course with preference given to pre-arranged assignments.

*Martin Ewald Prize.*—This prize, consisting of a silver cup, is awarded annually to the student achieving in the sophomore class having a scholastic average of B or higher and the most outstanding record in arithmetic.

*Julius S. Neyman Prize in Orthopedic Surgery.*—This prize of \$25, established in 1907 by Dr. Julius S. Neyman, is awarded annually to the student of the senior class of the School of Medicine who scores the highest grade in a written examination in orthopedics.

*Gamma Delta Kappa Prize.*—Alpha Delta Circle of Gamma Delta Kappa Fraternity offers annually a plaque to be awarded to "that member of the senior class who throughout his career has done the most constructive work in the furtherance and upbuilding of the University student activities."

*John Ostrander Prizes.*—These prizes were established in 1905 by the bequest of John Ostrander.

The amount of \$210 is awarded to the member of the graduating class in the School of Medicine who has the highest scholastic standing.

The amount of \$75 is awarded annually to the student in the Law School who has attained the highest average grade in the first-year, fall-

high degree and it is the student who has attained the highest standing grade in the corresponding technical course.

*Pai Dehsa Kappa Psi*.—This prize, established in 1911 by the House of Dehsa Chapter of Pai Dehsa Kappa, consists of a fine United States Government Savings Bond and is presented annually to the outstanding senior man in the teacher education program in the School of Education.

*Pai An Kappa Psi*.—The George Washington University Chapter of Pai An Kappa offers annually to the male student attaining the highest scholastic standing in his first full semester of work, a chosen book selected from the field of the student's major interest. The student's name will be entered on a plaque in the Office of the Dean of the Junior College.

*Pi Beta Phi Prize*.—A prize of \$25 is awarded annually by the District of Columbia Alpha Chapter of Pi Beta Phi Fraternity to the senior member of the union who, throughout her college career, has done the most constructive work in the promotion of student entry into among the women of the University.

*Pi Lambda Theta Prize*.—This prize, established in 1911 by Alpha Theta Chapter of Pi Lambda Theta, consists of a fine United States Government Savings Bond and is presented annually to the outstanding senior woman in the teacher education program in the School of Education.

*Psi Chi Prize*.—The George Washington University Chapter of Psi Chi, national honor society in psychology, offers annually two awards in the field of psychology: the first, \$25 to the best undergraduate student in Experimental Psychology; the second, \$25 to the graduate student submitting the best Master's thesis in Psychology.

*Rhapha Prize*.—The Rhapha Prize of \$25, established in 1911 by Professor William Rhapha in 1911, is awarded annually to a candidate for a bachelors degree who excels in mathematics.

*Sigma Kappa Prize*.—Eta Chapter of Sigma Kappa Sorority offers an annual prize of \$25 to the student with the highest grade in the final examination in General Chemistry.

*Sigma Psi Prize*.—Xi Chapter of Sigma Psi Fraternity offers annually a medal to be awarded to the student of the freshman class in the School of Engineering who maintains the highest scholastic standing in his work in the entire year.

*Society of Colonial Wars in the District of Columbia Prize*.—This award, in the form of a gold medal, established in 1911 by the Society of Colonial Wars in the District of Columbia, is to be awarded to a candidate for a graduate degree who, on the judgment of the Faculty of the Department of History, submits a thesis or dissertation demonstrating excellence in historical research in American Colonial history. The Uni-

prize, reserving the right to withhold the award if no theme of sufficient merit attaining the required degree of excellence is submitted.

*Sumner Prize.*—The Sumner Prize of \$25, established by the Sumner Sumner Fund, is awarded annually to the student making the best record in the most advanced course in the Latin language and literature.

*James MacBride Society, Inc. Prize.*—This prize, established in 1911 by Friends Laura MacBride Society in memory of her son, consists of books awarded annually to that student who achieves the highest average in Physics B, C, and D.

*Charles Chubb Parker Historical Club Prize.*—This prize of \$50, established in 1911 by the Charles Chubb Parker Historical Club and supported in part by the bequest of President Charles Chubb Parker, is awarded annually to the student who submits the best essay covering some phase of colonial history.

*John T. Adams Prize.*—Gordon B. Adams of Forty Two Postoffice offers annually a plaque to be awarded to that member of the senior class who has the most outstanding record in activities in the School of Engineering during the entire period of his residence.

*Thomas F. Walsh Prize.*—This prize of \$50, established in 1901 by Thomas F. Walsh, is awarded annually to that student who submits the best essay in Irish history.

*Washington Personnel Association Prize.*—The Washington Personnel Association awards annually a certificate and \$25 to an outstanding graduating senior in business administration who shows general excellence in studies, demonstration, responsibility in one or more courses in personnel administration, and whose qualities of leadership are proven through extra-scholastic activities.

*Alexander Wetmore Waddell Prize.*—This prize of \$25, established in 1911, by Mrs. Virginia Chase Waddell, is awarded annually to a candidate for a degree who writes the best essay on the subject of "the promotion of peace among the nations of the world". The prize essay shall become the property of the University and shall not be printed or published without the written consent of the University. The University reserves the right to withhold the award if no essay attaining the required degree of excellence is submitted.

#### Military Awards

*Society of American Military Engineers Gold Medal.*—This medal, offered by the Society of American Military Engineers, is awarded annually to selected Air Force ROTC cadets in the next-to-last year of their engineering course and in the last year of study abroad. Nominations are made jointly by the Professor of Air Science and the Dean of the



School of Engineering, and that award is made annually by a board of three senior Air Force officers.

*Aircraft Forces Communications and Electronics Achievement Gold Medal*.—This medal, offered by the Aircraft Forces Communications and Electronics Association, is awarded annually to outstanding senior Air Force ROTC cadets receiving an Electrical Engineering who demonstrate outstanding qualities of military leadership and distinguish themselves academically as by leadership in campus activities.

*Air Force Association Bronze ROTC Medal*.—This medal, offered by the Air Force Association, is awarded annually to that cadet who, after completion of Air Force ROTC primary training, is judged to be the outstanding cadet among those who have indicated their intention to apply for Army training upon graduation.

*Engine Officers' Association Medal*.—Cash award, not bronze medal, offered by the Engine Officers' Association of the District of Columbia, are awarded annually to those cadets enrolled in Air Science III, II, and I, respectively, who receive the highest grades for the current year in the leadership and academic phases of the Air Force ROTC course.

*Chicago Tribune Gold ROTC Medal*.—This medal, offered by The Chicago Tribune, is awarded each summer to that cadet enrolled in Air Science IV who has made an outstanding contribution to the effectiveness of the Air Force ROTC program by demonstrating the highest levels of leadership and academic excellence.

*Chicago Tribune Silver ROTC Medal*.—This medal, offered by The Chicago Tribune, is awarded each summer to that cadet of the Air Force ROTC Basic Course who has demonstrated outstanding leadership potential and who has maintained excellent scholarship standing in the University.

*Four of the American Revolution ROTC Medal*.—This medal, offered by the District of Columbia Society, Four of the American Revolution, is awarded annually to that freshman cadet of each Air Force ROTC flight who demonstrates to the maximum degree traits and qualities of good citizenship and meets the prescribed requirements established by the donor.

*Don Engineering Trophy*.—This silver trophy, offered by Walter G. Berry, Jr., Colonel, USAF (Retired), first Professor of Air Science at the University, is awarded annually to the Air Force ROTC flight awarded best in a semester's testing and inspection. The Cadet Commander of this flight is presented a set of engraved General Eisenhower's glasses.

*The Colonel Carter Rifle Trophy*.—This trophy, offered by Major Sergeant Jerome Carson, USAF, first coach of the Air Force ROTC Rifle Team at this University, is awarded to that cadet who is judged to be the outstanding member of the rifle team.



*Arnold Air Society Trophy*—This trophy, offered by the Civil Aeronautics Administration of the Arnold Air Society, is awarded annually to the outstanding cadet completing the basic course with a cumulative average of B or better in Air Force ROTC courses.

*Perching Rifer Gold, Silver, and Bronze Achievement Medals*—These medals are awarded annually by the National Headquarters to those Air Force ROTC cadets who are Perching Rifemen and who are judged to be outstanding members of the locals at the Perching Rifle.

*Republic Aviation Award*—An engraved identification bracelet, offered by the Republic Aviation Corporation, is awarded annually to that cadet enrolled in Air Science III who, in competition, makes the most effective verbal presentation on the Air Force theme.

*The Cruise Award*—A Cruise miniature airplane, offered by the Consolidated Vultee Aircraft Corporation, is awarded annually to that cadet enrolled in Air Science II who achieves the highest cumulative grade in the basic course and who applies for flight training.

*Senior Officers' Association Junior Memberships*—Five junior memberships, offered by the Senior Officers' Association of the District of Columbia, are awarded annually to the five Air Force ROTC cadets who obtain the highest grades in Air Science III.

*National Rifle Association Rifle Champion Medal*—This medal, offered by the National Rifle Association, is awarded to a cadet-member, junior or senior member of the Air Force ROTC Rifle team judged to be the outstanding member of the team based on workmanship, participation in team matches, and contribution to the effectiveness of the team.

*National Rifle Association Qualification Medals*—These medals, offered by the National Rifle Association, are awarded annually to members of the Air Force ROTC Rifle team qualifying as Expert Sharpshooters or Marksmen in indoor rifle firing.

*Air Force ROTC Rifle Team Trophies, Plaques, and Medals*—Trophies, plaques, and medals are awarded annually to Air Force ROTC Rifle Teams through national competition in the following:

- The Air Force ROTC Liaison Area Championship Matches.
- The Army and Area Inter-collegiate and Inter-scholastic Matches.
- The Secretary of the Air Force ROTC Rifle Match.
- The William Randolph Hearst National ROTC Rifle Matches.

#### FINANCIAL AID

##### STUDENT EMPLOYMENT

Graduate and undergraduate student scholarships are available in several departments of the University. Application should be made to the executive officer of the department of instruction concerned.

The Plummer College maintains a registry of positions available in many fields of work and refers qualified applicants for consideration.

## LOAN FUNDS

The following loan funds are available to students in the University in accordance with the qualifications stated herein. In the absence of inquiry should be directed to the Office of the Treasurer.

**University Loan Fund.**—The Trustees of The George Washington University have established a loan fund in honor.

**Home Economics Loan Fund.**—This fund of \$10,000, contributed by the D. C. Home Economics Association, is available for loans to women qualifying in Home Economics.

**Katharine Mather School Loan Fund.**—The U. S. Kelllogg Fund, for St. Barnabas School, Washington, has established a fund of \$10,000 for loans to students in the School of Medicine.

**Law Association Loan Fund.**—The George Washington Law Association has established a loan fund in the amount of \$2,000.44 for loans to students in the Law School.

**School of Medicine Loan Fund.**—This fund of \$10,000, contributed by medical students, is available for loans to students in the School of Medicine.

**Physio-Medical School Loan Fund.**—The U. S. Physio & Co., Inc., has established a fund of \$1,000.00 for loans to students in the School of Medicine.

**Women's Educational Memorial Foundation Loan Fund.**—This fund, established by the friends and family of William Schenck, in the amount of \$10,000, is available for loans to women studying pharmacy.

**Henry Strong Educational Foundation.**—The Henry Strong Educational Foundation, established in Chicago under the will of General Henry Strong, makes available a fund for loans to both men and women students under the age of twenty-five years.

**Henry Strong-Hughes J. Henry Loan Fund.**—This fund, also derived from the estate of the Henry Strong Educational Foundation, is to be loaned to students under the age of twenty-five years in the George Washington University Law School.

**Washington Medical School Loan Fund.**—This fund, in the amount of \$10,000, was established by Mrs. John L. Washington, is available for loans to students in the School of Medicine.

## REGULATIONS

A student enrolled in the University is required to conform to the University regulations and to comply with the rules and regulations of the college, school, or division in which he is registered.

A student who withdraws or is suspended, or is otherwise absent from the University for one semester or more, may re-enter and continue his work only under the rules and regulations in force at the time of his return.

If a student knowingly makes a false statement or furnishes material information on an application for admission, registration card, or any other University document, his registration must be canceled and he will be ineligible (except by special action of the Faculty) for subsequent registration in any part of the University.

### ATTENDANCE

A student is not permitted to attend classes until registration has been completed and fees have been paid. Regular attendance is required. A student must be dropped from any course for undue absence.

A student who has been dismissed, either for delinquency or absence of one or two or other reasons, is not permitted to attend classes during the period of suspension.

For further regulations regarding attendance, consult the regulations of the several colleges and schools.

### SCHOLARSHIP REQUIREMENTS

A student who fails to maintain the scholarship requirements at the college school, or division in which he is registered may be dismissed from the University.

### GRADUATE

Grades are not given out by instructors but are mailed to the student through the Office of the Registrar at the close of each semester. Upon receipt, a copy of the student's grades will be forwarded to his parent or guardian.

The following grading system is used: excellent, *A*; good, *B*; average, *C*; passing, *D*; failing, *F*. Whenever a grade has not been assigned the symbol *In.* (Incomplete) is the grade. *H* (Honorary withdrawal) will be awarded. The grade *In.* indicates that a satisfactory explanation has been given the instructor for the student's failure to complete the course work of the course. No "incomplete" can not be made up.

about the issue of one student past papers in possession of the Faculty. Officers from which a student has withdrawn by private authorization will be initiated by the system *H*. No student may request for grade a course in which he has received at least a grade of *D*, unless required to do so by the instructor involved.

For graduate work, grades are indicated as "satisfactory", "unsatisfactory", "non-satisfactory".

For the grading system of the Law School and the School of Medicine, see the explanation in the communications of these schools.

#### GRADING POINT SYSTEM

Grading points are assigned from grades as follows: *A*, four points; *B*, three points; *C*, two points; *D*, one point; *F*, no points; two point system basis for which the following represents:

Advancing or improving in terms of the grading-point system, obtained by dividing the number of grading points for the number of courses taken for which the student has completed work based on the following: completed course, *A* through *D*, or *F*, or two, not yet completed is zero; failing the course, except that course marked *W*, will be considered zero; a second grade is recorded, or at the close of a calendar year withdrawn course, *W*, or "incomplete" is not represented as a grade in grade-point system. If a "completed" is not represented as a grade in grade-point system, it is computed as zero quality points. Grades in courses taken at another institution are not considered in computing the student's grade-point.

#### EXAMINATIONS

Examinations are scheduled in all courses at the end of each semester or at the conclusion of the course.

The Examinations Committee, representing members of the administration, the several colleges, schools, and divisions.

#### ACADEMIC DISCIPLINARY

Failure of satisfactory on the part of any student will result in his removal from the University upon the recommendation of the appropriate health board.

A student found guilty of dishonesty will be removed and credit for all courses in the semester during which the dishonest act occurs.

A student who is guilty of dishonesty in the University after his removal of not having been removed from some institution. Student cases not initiated will be taken up by the Board's Council. The Board's Council will recommend to the President that a student suspended from the University will not be readmitted.



# WITHDRAWAL

*Withdrawal from a course or from the University, without withdrawal in default penalty, requires the permission of the dean of the college school or division in which the student is registered. Permission to withdraw from the University will not be granted a student who does not have a clean financial record. (See "Fee and Financial Regulations," pages 32-33.)*

*Withdrawal during October is not the end of the fall semester and January February 28 not the end of the spring semester is permitted only in exceptional cases.*

*All charges for courses granted without the approval of the dean must be met by the student. Refusing the dropping of a course is an intention not met effect in discontinuance.*

*A student may not withdraw from either the basic course or the primary course of the Air Force ROTC, without the approval of the President of the University.*

## CHANGES IN PROGRAM OF STUDY

*Change within a college, school or Division.—A student may not change or drop courses (see "Withdrawals," above) or change location to that of another school with the approval of the dean of the college, school, or division in which he is registered.*

*Change from one section to another of the same course may be made with the approval of the dean and the department concerned.*

*Change from one major subject to another within the same college or school may be made with the approval of the dean. All requirements specified in the course of study in which the change is made must be satisfied.*

*Transfer within the University.—Transfer from one college, school, or division to another may be made only with the approval of the dean concerned. Except in cases of special permission from the Junior College to Valhalla College or the School of Government or a regular two-year program, application for transfer must be made to the Director of Admissions in the proper form provided by his office.*

*In order to provide degree candidates with proper academic counsel and the benefits of integrated programs of study, the faculties of the various schools and colleges have established minimum residence requirements and regulations with regard to supervision of the work done in the student's major field. In addition, various special regulations regarding course requests, selection of electives, and advisory approval of programs apply in particular cases. Students transferring within the University are advised to study carefully the graduation requirements on pages 12-13 and to note that in all undergraduate divisions*

about the Junior College and the College of General Studies, as well as those relating to that or another faculty in the same field, may be handled in conference in the school or college from which the degree is sought. After transfer the student should consult the dean, registrar and admissions about the requirements to meet before. (The entrance requirements in the Junior College, are page 64. For information concerning the College of General Studies, see separate bulletin.)

#### UNIVERSITY

Great interest is shown in given more strict regular requirements for satisfactory completion of the required work of classes in the University, as well as giving of reference teaching in accordance with the regulations for credit ratings, credits and divisions.

On request the Registrar will send to the student a statement showing the amount of work completed and the requirements for graduation and graduation, including other test for the degree.

In some instances, a student who has been permitted to attend University and be registered with the permission of the University, as in "indirect" or a class (for academic reasons) the student is not required to take more than a few courses or to take examinations.

#### TRANSFER OF STUDENT

Other requests of student transfer will be handled as request to other institutions. Transfer credit of credits will be based on the student's request. No charge is made for the first transfer; a fee of one dollar is charged for each subsequent transfer. No certificate of work done will be issued but a student who does not have a first transfer must.

#### Transfer Student, Credit

A student who does not attend classes will be asked to transfer credit with the intention of being advised or advised only transfer students from one University to another must attend the classes required at the time of his college or school. In no case will work credits be recognized as an award in payment of that which might be earned in a similar period in this institution.

#### EDUCATIONAL REQUIREMENTS

Students in the Junior College and Institute and departments in the School of Engineering are required to take Physical Education 1-4 and 10-14 unless they are registered for less than 12 credits. Students in other departments are required during the day unless it is necessary to take all classes during the evening hours. All First, Second, Third, and Fourth year students of Institute and departments must take minimum 12-14 credits 1-4 and 10-14 for the physical education requirement.

For minor examinations will be granted only upon written petition which has been recommended by the physical education department concerned and approved by the dean of the college or school in which the student is employed.

Junior College students exempt from the physical education requirements will be required to substitute their hours of studies.

It is not intended that the University with advanced standing is not exempt from the physical education requirements unless the law indicates otherwise and the appropriate authorities.

The physical and physical education requirements, as specified by the University of physical education, will be arranged at the time of registration.

#### EXAMINATION REQUIREMENTS

It is recommended by the Faculty for graduation a student must have met the admission requirements of the college or school in which he is employed, completed satisfactorily the satisfactory examination, residence, and other requirements for the degree for which he is registered, and be free from all indebtedness to the University.

**Admission for Graduation.**—Application for a degree should be filed in the Office of the Registrar at the time of registration for the last semester of the student's last year.

**Residence.**—In all undergraduate divisions of the University the minimum requirement for graduation is a quantitative value of at least one year.

The graduate student must meet the satisfactory requirements for the bachelor's degree for which he is registered.

**Graduation.**—Minimum satisfactory requirements for each degree are stated under each college or school offering board in preparation for the degree. (For the Four R.C.C. graduate requirements see the Department of the Registrar.)

**Residence.**—Unless otherwise specified, in all undergraduate divisions of the University a minimum of three calendar years, including at least twelve hours in the major field, must be completed in residence in the school or college from which the degree is sought. This requirement applies to students transferring within the University as well as to students transferring from other institutions. Summer work may be counted in residence, but in no case may the credit in residence aggregate less than thirty weeks. Upon special permission is granted by the dean of the college or school concerned to pursue such classes, the work of previous or following years must be completed in residence.

The graduate student must meet the residence requirements for the particular degree for which he is registered.

What the minimum of the dean of the college or school concerned.

a student may be granted leave of absence; such student should, however, remain technically in residence by paying the minimum fee for each semester he is absent. For the purpose of this regulation, the same rule again will be disregarded.

**Graduate School Examinations.**—All candidates for Bachelor's degrees in Lafayette College, the School of Engineering, the School of Commerce, and the College of General Studies are required to take examinations at the Graduate School Examinations at the University's institutional testing system. The examinations are conducted in the summer term of a year, the Fall Term Session (December 2, 1955) for students graduating in February, and the Spring Session (April 12, 1956) for those graduating in June or October. Dates of the examinations are announced in the *Directory of Classes*.

Each student required to take the Graduate School Examinations must register for it in the office of the dean when he registers for his final regular semester of study (including summer sessions). A By-Appointment fee is payable at the time of registration.

Students will receive individual notices of test scores and final award denotation of the regular university sessions at the Educational Testing Service. By special permission students who register as graduates or have won their Graduate School Examinations at the previous Fall Term Session, may have emergency notification early in the year when applying for admission to graduate schools.

For the arrangements of the various schools and colleges in the University see a description of the same required.

**Students and Graduates.**—The University reserves the right to refuse to confer a degree upon a candidate whose conduct or conduct has been unsatisfactory.

**Copyrights, Printed, Plans, or Dissertations.**—A correspondence address, name, or designation indicated in partial satisfaction of requirements for the Master's degree, the professional degree in engineering, the degree of Doctor of Education, the degree of Doctor of Jurisprudence, the degree of Doctor of Business Administration, or the degree of Doctor of Philosophy must be presented in its final form to the dean of the college or school concerned not later than the date specified in the University calendar. Three copies of each are required, one typewritten original and two legible well-constructed carbon copies. Detailed instructions for the filing should be obtained from the appropriate dean.

Accepted correspondence problems, theses, or dissertations, with accompanying drawings, become the property of the University and are deposited in the University Library, where the duplicate copies are bound and made available for consultation. Permission to publish or other material in them must be secured from the appropriate dean.



*Presence at Graduation.*—A candidate is required to be present at the graduation exercises unless written notification for graduation is otherwise authorized by the dean of his college or school.

### HONORS

*With distinction.*—In all undergraduate divisions of the University the degree may be conferred "with distinction", at the discretion of the Faculty, in a student attaining a quality-point index of .70 or higher on all work taken at this institution except that taken during the summer immediately preceding the granting of the degree. To be eligible for this honor a student must have completed at this institution at least one-half of the work required for the degree.

In the School of Medicine and the Law School, degrees may be conferred "with distinction", at the discretion of the Faculty, on those students who attain an average of 80 on all work taken for the degree.

*Special honors.*—Special honors may be awarded by the Faculty to one member of the graduating class for outstanding achievement in the student's major field of work on recommendation of the major department, under the following regulations:

1. The student must have his candidacy for special honors approved by the faculty member representing the major department or field not later than the beginning of the senior year.

2. The student must meet such other conditions as may be set as the time his candidacy is approved.

3. The student will be awarded special honors when he has a quality-point index of at least .80 on all work taken at this institution except that taken during the semester immediately preceding the granting of the degree.

4. To be eligible for honors a student must have completed at this institution at least one-half of the work required for the degree prior to the beginning of the semester immediately preceding the granting of the degree.

*Military honors.*—An Air Force ROTC cadet may be designated a "Distinguished Air Force ROTC Cadet" if he (1) has completed Air Science (II) with an academic standing among the upper third of the students enrolled therein; (2) has an accumulative academic average of B or better; (3) possesses high moral character and definite aptitude for service in the Air Force; (4) has distinguished himself by demonstrated leadership through participation in recognized extra-curricular activities and while in attendance at an Air Force ROTC Summer Training Unit. A "Distinguished Air Force ROTC Cadet" is authorized to wear a "Distinguished" badge centered above the right breast pocket of the uniform. He may submit an application for a regular commission in



THE COLLEGES, SCHOOLS, AND DIVISIONS





## THE JUNIOR COLLEGE

## THE FAULTS IN AND STATE OF POLYETHYLENE. I.

George Martin Kunitz, A.M., *Dean of the Junior College*  
William Lewis Turner, Ph.D., *Assistant Dean of the Junior College*  
Curt Hartman Jacob, A.M., *Assistant Dean of the Junior College*

James Henry Taylor, Ph.D., *Professor of Mathematics*  
Elmer Louis Taylor, Ph.D., LL.D., *Professor of American History*  
Warren Ford Webb, Ph.D., *Professor of Political Science*  
Ruth Harrison Atwell, A.M., *Professor of Physical Education for Women*  
Francis Edgar Johnson, Ph.D., *Professor of Mathematics*  
Suzanna Douglas Van Evert, Ph.D., Sc.D., *Professor of Chemistry*  
Mark Irving Grossman, Ph.D., *Professor of Romance Languages*  
Edith Dale Kemmer, Ph.D., *Professor of Agriculture*  
Frederic Moore Myers, Ph.D., *Professor of Mathematics*  
Wood Green, Ph.D., *Professor of American History*  
Thomas Ross, Ph.D., M.D., *Professor of Pathology*  
Ira Sumner Brown, Ph.D., *Professor of Zoology*  
Paul William Brown, Ph.D., *Professor of Botany*  
Arthur Edward Baring, Ph.D., *Professor of Economics*  
John Watson Brown, Ph.D., *Professor of International Law*  
Frederic Kirkpatrick, A.M., *Professor of Home Economy*  
William Henry Myers, A.M., *Professor of Physical Education for Men*  
Hendrick Lucas Cluett, Ph.D., *Professor of Zoology*  
Samuel Nathaniel Weiss, Ph.D., *Professor of Chemistry*  
Charles Rudolph Noyes, Ph.D., *Professor of Economics*  
Howard Maxwell Morrison, Ph.D., *Professor of American Diplomatic History*  
Frederic Oswald Sigward, A.M., *Professor of English Literature*  
Frederic Salisbury Taylor, Ph.D., *Professor of English Literature*  
Charles William Bloom, M.D., *Professor of Pharmacy*  
Alfred Thomas Dehler, A.M., *Professor of Romance Languages*  
Myron Lee Roney, Ph.D., *Professor of American History*  
Charles Darlington Loomis, Ph.D., *Professor of English Literature*  
Charles Edward Glaser, M.A., B.S., Ph.D., *Dean Professor of Philosophy*  
Donald Channing Ellis, B.A., M.F.A., *Professor of Art*

[illegible]

- Helen Roscoe Lawrence, A.M., *Professor of Physical Education for Women*  
 Charles William Cole, Ph.D., *Professor of American Literature*  
 George Martin Knott, A.M., *Professor of Physics*  
 Dublin Fox Ingram, A.M., Ed.D., *Deane Professor of Ethics*  
 Robert Dale Campbell, Ph.D., *Professor of Geography*  
 John Francis Linnane, Ph.D., *Professor of Chemical Laboratory and Librarian*  
 Joseph Harvey Seavey, M.S., Ed.D., *Professor of Physical Education for Men*  
 Robert Hubert Dooling, Ph.D., *Professor of European History*  
 Carlos West Fernald, Ph.D., *Professor of Spanish*  
 William Milford Towner, A.M., *Professor of Home Economics*  
 Elizabeth Barrett, A.M., *Professor of Physical Education for Women*  
 Robert Collins Vincent, Ph.D., *Professor of Chemistry*  
 Louis Elizabeth Merriam, Ph.D., *Professor of Zoology*  
 William Fernald Sage, Ph.D., *Professor of Chemistry*  
 Annora Abner, A.M., *Assistant Professor of Spanish*  
 Gertrude Laura Rogers, Ph.D., *Assistant Professor of German*  
 William Earl Engler, Ph.D., *Assistant Professor of German*  
 William Lewis Taylor, Ph.D., *Assistant Professor of English*  
 Jerome Horvick, A.M., *Assistant Professor of English Composition*  
 Edwin Edward Taffel, Ph.D., *Assistant Professor of Psychology*  
 George Francis Higgins, Jr., Ph.M., *Assistant Professor of Spanish*  
 \*Robert Hamilton Mann, Ph.D., *Assistant Professor of English Composition*  
 Harriet Leonard Moore, A.M., *Assistant Professor of French*  
 Rachel Emeline Wind, Ph.D., *Assistant Professor of Chemistry*  
 Mabel Hope McCordine, Ph.D., *Assistant Professor of English Literature*  
 John David Nelson, Ph.D., *Assistant Professor of Mathematics*  
 John Clark Mason, Ph.D., *Assistant Professor of Biology*  
 James Harold Colville, Ph.D., *Assistant Professor of American Literature*  
 Curt Bradford Lamb, A.M., *Assistant Professor of Zoology*  
 Kenneth George Hudson, B.A. in P.E., A.M. in Ed., *Assistant Professor of Physical Education for Men*  
 Willard Edmund Calkins, Ph.D., *Assistant Professor of Psychology*  
 Dan Tucker Smith, Ph.D., *Assistant Professor of Educational Psychology*  
 Estelle Ingerman, M.A. in English, *Assistant Professor of Spanish*  
 James Willard Harkness, B.A., Ed.M., *Assistant Professor of Chemistry*

\*The asterisk here means pending election.

\*The asterisk here means resigned.

- Milford Hunsley Scott, A.M., *Associate Professor of Statistical Studies*
- Clifton Earl Osmond, A.B., Th.D., *Associate Professor of Religious Literature*
- Lester Clark, Ph.D., *Associate Professor of Physics*
- \*Robert Arthur Freeman, Ph.D., *Associate Professor of European History*
- Philip Henry Higdon, Jr., Ph.D., *Associate Professor of English Literature*
- Vincent James DeAngelis, B.S., in P.E., A.M., in Ed., *Associate Professor in Physical Education for Men*
- John Hugo Mink, Jr., Ph.D., *Associate Professor of English*
- Thomas Peter Patton, Ph.D., *Associate Professor of Geography*
- Gregg Tobin, Ph.D., *Associate Professor of Sociology*
- Edward Calvin Hubert, Ph.D., *Associate Professor of American History*
- William Vincent Schmidt, Ph.D., *Associate Professor of Economics*
- William Edward Schuch, Ph.D., *Associate Professor of Chemistry*
- David Garret Weiss, B.S., in Eng., Ph.D., *Associate Professor of German*
- John Fernald Banning, Jr., Ph.D., *Associate Professor of English*
- Edward Feltz Turner, Jr., Ph.D., *Associate Professor of Physics*
- Louis Willis Kahn, A.M., *Assistant Professor of Economic Literature*
- Howard Richard Laddin, A.M., *Assistant Professor of Political Science*
- Robert Craythorn Wilson, A.B., *Assistant Professor of Jurisprudence*
- Leo Howard Eklund, A.M., *Assistant Professor of Speech*
- William Charles Chubb, Ph.D., *Assistant Professor of Finance*
- Helen Zsombor-Murray Yablonsky, B.S., *Assistant Professor of Eastern History*
- Harold Walter Whittemore, A.M., *Assistant Professor of Geography*
- Alvin Harold Diamond, Ph.D., *Assistant Professor of Zoology*
- John Gilbert Palmer, Ph.D., *Assistant Professor of Botany*
- Richard Ernest Murphy, A.M., *Assistant Professor of Geophysics*
- Eric Morris Johnson, A.M., *Assistant Professor of Psychology*
- James Earl King, Ph.D., *Assistant Professor of German*
- Carl Earl H. Coy, Ph.D., *Assistant Professor of Education*
- Richard Walter Simpson, Ph.D., *Assistant Professor of Zoology*
- Charles Francis McCall, Jr., Ph.D., *Assistant Professor of Statistics*
- William Earle Bunker, M.S.A., *Assistant Professor of Accounting*
- Laurance Percy Lohr, A.M., *Assistant Professor of Art*
- Frederic Harold Schmidt, Ph.D., *Assistant Professor of Philosophy*
- Joseph Louis Meyers, Jr., A.M., *Assistant Professor of Romance Languages*

\*The asterisk indicates those who are permanent residents.

James Oliver Gilliam, A.M., Assistant Professor of English Composition

John Lyle Peyton, A.B., Assistant Professor of Physics

Mary Jane Cook, A.M., Instructor in English Composition

Ronald Bruce Erwin, A.M., Instructor in English

André-Guy LaCerte, M.A., Instructor in Physics

Joseph Louis, A.M., Instructor in English Composition

William Truman Wright, A.M., Instructor in English Composition

Alfred Stuart Elliott, A.M., Instructor in English Composition

Thos. Mary Farnham, A.M., Instructor in English Composition

CHURCHMEN

The Dean's Office

Thos. Mary Farnham  
Richard Henry Hooker

James Oliver Gilliam  
John Lyle Peyton, Jr.

Philip Henry Hight, Jr.  
James Carl King

Committee on Academic and Religious Standards

Carl Bartholomew Leland, Chairman

Edith Elizabeth Mayhew  
William Herbert Child

David James White  
Henry Gordon McCall

Committee on Administration

William Lewis Turner, Chairman

Robert Corbin Warner  
Harry Bartholomew Child  
Herbert Walter Wainwright

Richard George Hooker  
William Herbert Child  
Eva Moore Johnson

College Chapel Advisory Committee

Dean of the Junior College, Chairman

Earl Harris Smith  
Charles Warren Wilson  
Robert Corbin Warner  
Carl Bartholomew Leland  
James Carl King

Frederick Krummholz  
Joseph Henry Knight  
William Lewis Turner  
Mildred Hollister Hunt  
Carol Ruthin Coy

\*The President of the University and the Dean of the Junior College are members ex officio of the Committee on Administration.



## GENERAL INFORMATION

### INTRODUCTORY

The Junior College, which administers the first two years of the standard four-year college program in the liberal arts and sciences, was established in 1926 as a part of the academic reorganization of the University. Prior to then, the four-year program had been administered by Columbia College since its organization in 1827.

The Junior College curricula continue the studies of a general cultural nature begun in the secondary schools, and lay a foundation for the more specialized work which is to follow. Emphasis is accordingly laid (1) upon the social, cultural, biological, and physical background of civilization and (2) upon the discipline necessary to the effective pursuit of more advanced work.

The Junior College also provides the preprofessional work required for admission to the schools of Pharmacy, Education, and Government, and the first two years of the preprofessional work required by the schools of Medicine and Law.

In addition it provides the following two-year curricula in vocational training: Accounting, Home Economics, Medical Technology—Basis Course, Physical Education, and Secretarial Studies.

### ADVISORY SYSTEM

In order that students may have opportunities for assistance in planning their courses and also for obtaining personal, educational, and vocational advice in every phase of their academic work during the first two years, a number of members of the Faculty serve as advisors to Junior College students.

Members of the Faculty, selected for their knowledge of Junior College requirements and student programs, advise students in making up their programs of study for each semester. A separate staff of experienced advisors under the direction of the Dean assists those students who find it difficult to make adjustments to college life because of adjustment or other reasons. Students who are "warned" or who are on probation may be required to consult these advisors at regular intervals. Students are encouraged to consult any member of the Advisory Staff on their anxieties about college problems at any time.

Cases of cases of "warning" or probation will be sent to the parents or guardians of students on request, and the Dean and members of the Advisory Staff are available for consultation with parents or guardians concerning student problems.

## SCHEDULE

*Students in the Junior College are subject to, and are referred to, regulations promulgated with the regulations regarding Admission, Examinations, Fees and Expenses issued in June 1941, and the University regulations issued in June 1942.*

## SIX-MONTH ADVANCE TERM

Students admitted to the Junior College may be required to take the college entrance exam of the University.

## ENGLISH PRELIMINARY EXAMINATIONS

English—Elemental, Advanced—Composition: required of all entering students, will be conducted by the English Department. Before students are registered in English 1, they are tested by the minimum committee of teachers, reading, grammar, standard usage, and writing skills. Those students who show marked improvement from their previous facility may be exempted from one or both halves of the English Composition course. Those who are continuously successful in English 1 will be exempted to English 2.

Foreign Languages—A student's elemental examination will be required of all entering students who will be entering in college the language before in high school (French, German, or Spanish). Upon completion of the examination languages will be listed in the department course with credit to be assigned on the usual basis. This does not apply to students whose previous experience in a given language is equivalent to two college years.

The Use of Correct English—The use of precise English, oral or written, is essential not only in English but also in all other courses (see page 54-55).

## FIRST AND SECOND-YEAR COURSES

A Junior College student may not take a foreign-group course (courses numbered 100-199) without the advice and consent of the instructor and of the Dean of the Junior College. A student will not be permitted to complete a foreign-group course required under the curriculum for which he is registered in order to take a second-group course for honors credit. The principle that foreign-group courses must be taken in the Junior College only, and advanced courses in Graduate College and the professional schools, will be rigidly adhered to in registering student programs. No student or graduate is permitted to take second-group courses except by the express permission of the Committee on Scholarship.

## AMOUNT OF WORK

Students in semester semester hours constitute a normal academic load. A student not in probation must be permitted by the Dean to take excess semester hours.

A student having a quality-point index of 2.0 or more, with the permission of the Dean, may pursue an excess semester hours. No student may take more than twenty semester hours, except with the permission of the Committee on Undergraduate Education.

For an employed student working twenty or more hours a week, an excess semester hours constitute a normal academic load. An employed student may not be permitted by the Dean to take excess semester hours. An employed student having a quality-point index of 2.0 or more be permitted by the Dean to take fifteen or fourteen semester hours.

A student previously employed who accepts full-time employment in registration or at any time during a semester is required to report that fact immediately to the Dean and to bring his program within the limitations set by the Faculty upon the amount of work to be carried by an employed student.

## ATTENDANCE

The student is held responsible to the instructor in charge of the course for which he is registered for all the work of the course, and all absences must be excused before positions will be made for him to make up the work missed.

With the exception noted below, unexcused absences from a course are to excused in making the semester hours of credit for the course, will be automatically excused. (If a course has distinct divisions such as lecture, laboratory, recitation, etc., those courses will give credit to each separate division.) In the application of this rule absences consistently exceeding the following limits are to be counted double.

First semester courses are limited to seven the maximum number of absences and are to constitute no cumulative privilege. A student in probation is allowed no automatic excuses.

Excesses for absences from more or more consecutive class periods, and for absences from examinations which have been announced in advance, may be provided only by making written application to the instructor in charge of the course.

A student whose absences from any class, whether excused or unexcused, are in excess of one-fourth of the total number of class periods will receive the grade of F for the course, except by special ruling of the Dean on recommendation of the instructor in the course.

EXAMINATION OF JOURNALISTS

A student who has successfully completed at least three semesters of study at work, including editorial experience, before he has completed his admission is allowed an examination.

THE DIXIEAN

From the satisfactory completion of the requirements of the Junior College the student is admitted to the Dixiean as follows:

REQUIREMENTS FOR THE DIXIEAN

Entrance

The last Dixiean before he will be admitted by the Committee's report will be when he is admitted to the Junior College.

Examination

The system of grading and of receiving admission is described in detail in pages 47 and 48.

In order to receive the degree of Associate in Arts or Associate in Science a student must have a satisfactory record of at least two years.

*House Rules.*—The student who enters the college is subject to the rules of the college as laid out in the book of the college. The student will be allowed to live in the college and will be allowed to live in the college. A student who has completed a course of study in the college will receive a certificate of admission to the college.

*Student's Entry.*—The student who enters the college is subject to the rules of the college as laid out in the book of the college. The student will be allowed to live in the college and will be allowed to live in the college.

*Professor's Entry.*—A student who enters the college is subject to the rules of the college as laid out in the book of the college. The student will be allowed to live in the college and will be allowed to live in the college.

A student who has completed a course of study in the college will receive a certificate of admission to the college. The student will be allowed to live in the college and will be allowed to live in the college. The student who has completed a course of study in the college will receive a certificate of admission to the college. The student will be allowed to live in the college and will be allowed to live in the college.



**Attention.**—A student whose quality-point index is below 2.00 is subject to suspension by the Committee on Scholarships.

A student desirous of next year's scholarship must apply for consideration after an interval of one calendar year. On application for consideration the student must submit specific evidence to the Committee on Scholarships that he is better qualified to pursue college work.

A student suspended twice for poor scholarship will not be readmitted.

**Mathematics (Prerequisite).**—At the end of the second week of each semester instructors file in the Office of the Junior College the names of those students who are doing work at *D* grade or lower. A Notice of Warning is sent to the student and is sent filed with the association officers. A "warning" communication is the student that he may consult his instructor and advisor at the meeting immediately.

#### CUMULATIVE REQUIREMENTS

The satisfactory completion of *approximately* sixteen hours of college work is necessary as evidence in one of the Junior College cumulative portfolios.

Except for students registered for the combined degrees of Bachelor of Arts and Doctor of Medicine, no more than twelve semester hours of professional courses may be included in the one hundred and twenty-hour minimum hours required for the Bachelor's degree in Columbia College. Junior College students offering professional courses must also meet about the approval of the Dean of the Junior College before registering for these courses.

**Physical Education Requirement.**—Physical Education or Aerobic ROTC (including Laboratory) is required of all students in the freshman and sophomore years. (See "Physical Education Requirement," pages 22 and 23.)

**Foreign Language Requirement.**—In cumulating remaining foreign language a student must complete satisfactorily the equivalent of two years of college work in a single foreign language.

A student offering no admission first acceptable high school entry of a single foreign language, or the equivalent, is not required to take any foreign language.

A student who offers less than two units and speaks no more than the Junior College requirement in continuing in the same language must take the language placement test (see page 62).

In general, one year of high school language is considered to be equivalent to one semester of college language.

It must be noted foreign languages are required or recommended as prerequisites for advanced work in Columbia College and the professional schools. The student should consult his advisor as to these requirements.

quilibrium, as that appropriate foreign language may be included, when necessary, in the Junior College program.

**English Requirements.**—Incoming students registered in the pre-Columbian College curricula will follow the course of English 1, both before and out of the introductory literature course, and English 2. That does not mean an absolute transferring to that curricula as students registering in the pre-Columbian or vocational programs.

## JUNIOR COLLEGE CURRICULA

### I. CURRICULA FOR ADMISSION TO COLUMBIAN COLLEGE AND THE PROFESSIONAL SCHOOLS

Each of the following curricula comprises the first two years of a student's preparatory college course and prepares the student for upper division work.

All curricula in this group lead to the degree of Associate in Arts.

#### A. COLUMBIAN COLLEGE

##### 1. CORE AND LEAVENS

The following program constitutes the core for the Bachelor of Arts program in Columbian College.

English Courses		Prerequisites
English Composition and Literature	English 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 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833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

The following program constitutes the core for the Bachelor of Arts program in Columbian College.



Students planning to complete the requirements for the degree of Bachelor of Science in Pharmacy (see pages 33-34) in four years must complete one hour of general elective credit in addition to the Junior College curriculum listed below. One of this work may be completed during the fall and spring semesters. The remainder may be completed during a summer session.

Field	Requirements	Hours
Math	Calculus I, II, III, and IV, Chemistry 11-12, Physics 1-4, English 1-4 (Freshman year)	16
Junior Science	Chemistry 11-12 (Freshman year)	4
Intermediate Science	Physics 1-4 (Freshman year)	4
Physical Science	Chemistry 11-12, 13, 14 (Freshman year)	4
General	All other credit for minimum of 16 hours	16
Total		36

### C. SCHOOL OF EDUCATION

#### 1. EDUCATION

The following four-year curriculum prepares for the Bachelor of Arts in Education curriculum in the School of Education.

Field	Requirements	Hours
English	English 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	16
Physical Education	Physical Education 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	16
General Education	General Education 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	16
Junior Science	Chemistry 11-12 (Freshman year)	4
Intermediate Science	Physics 1-4 (Freshman year)	4
Physical Science	Chemistry 11-12, 13, 14 (Freshman year)	4
General	All other credit for minimum of 16 hours	16
Total		36

For a complete list of courses and descriptions, see the School Catalog.



## HOME ECONOMICS

The following two-year curriculum prepares for the Bachelor of Science in Home Economics according to the School of Education:

		Hours (1917)
English	English 4, 5	2
	English 14-16, 17-18, 19-20, 21-22, 23-24, 25-26	2
Physical Education	See course plan for minimum of instruction	2
Mathematics	Mathematics 4, 5	2
Science	Science 7-8, Chemistry 19-20, Physics 21-22	6-8
Home Studies	Domestic Science, Political Science, History	11
Music	Music 1-12 (Practical work)	2
	Music 13-14, 15-16, 17-18, 19-20, 21-22	2
Art	Art 1-12 (Practical work)	2
	Art 13-14, 15-16, 17-18, 19-20, 21-22	2
Total		34

## PHYSICAL EDUCATION FOR MEN

The following two-year curriculum prepares for the Bachelor of Science in Physical Education according to the School of Education:

		Hours (1917)
English	English 4, 5	2
Physical Education	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	2
Mathematics	Mathematics 4, 5	2
Home Studies	Domestic Science, Political Science, History	11
Music	Music 1-12 (Practical work)	2
	Music 13-14, 15-16, 17-18, 19-20, 21-22	2
Art	Art 1-12 (Practical work)	2
	Art 13-14, 15-16, 17-18, 19-20, 21-22	2
Total		34

## PHYSICAL EDUCATION FOR WOMEN

The following two-year curriculum prepares for the Bachelor of Science in Physical Education according to the School of Education:

		Hours (1917)
English	English 4, 5	2
	English 14-16, 17-18, 19-20, 21-22, 23-24, 25-26	2

The following curriculum is based on the minimum of instruction for the Bachelor of Science in Physical Education according to the School of Education:

Physical Sciences	I, II, III, IV	4
History	English, French, Italian, etc.	2 to 5
Modern Languages	Latin, Greek, etc.	4
Mathematics	Algebra, Geometry, etc.	4
Science	Physics, Chemistry, etc.	4
Art	Drawing, Painting, etc.	4
Music	Music, etc.	4
Physical Education	Physical Education, etc.	4
Other	Other, etc.	4
Total		36

### IX. SCHOOL OF GOVERNMENT

#### 1. ACCOUNTING AND BUSINESS ADMINISTRATION

The following courses are offered by the School of Accounting and Business Administration in the School of Government:

Accounting	Accounting, I, II	4
Business Administration	Business Administration, I, II	4
Finance	Finance, I, II	4
Marketing	Marketing, I, II	4
Operations Management	Operations Management, I, II	4
Production Management	Production Management, I, II	4
Quality Management	Quality Management, I, II	4
Supply Chain Management	Supply Chain Management, I, II	4
Total		32

#### 2. FOREIGN AFFAIRS AND PUBLIC AFFAIRS

The following courses are offered by the School of Foreign Affairs and Public Affairs in the School of Government:

Foreign Affairs	Foreign Affairs, I, II	4
Public Affairs	Public Affairs, I, II	4
International Law	International Law, I, II	4
Political Science	Political Science, I, II	4
Social Science	Social Science, I, II	4
History	History, I, II	4
Geography	Geography, I, II	4
Language	Language, I, II	4
Total		32

## II. BUSINESS AND ECONOMIC STATISTICS

The following two-year curriculum prepares for the Bachelor of Arts in Government, graduation in Business and Economic Statistics in the School of Government:

		Hours
Accounting	Accounting 1-3	6
English	English 1, 2	6
Foreign Language	See pages 30-31 for foreign language requirement	14
Mathematics	Mathematics 10 and 11	4 1/2 or 5 1/2
Physical Education	See pages 30-31 for requirement of requirement	2
Social Studies	Economics 1-4; Philosophy 10-11	14
Statistics	Statistics 17 or 18	1 1/2 or 2
Total		44 or 46

## II. VOCATIONAL CURRICULA

In addition to the above curricula, all of which prepare for admission to senior business colleges and schools, the Junior College offers the following two-year vocational curricula:

The curricula in Accounting and Commercial Studies lead to the degree of Bachelor in Arts. The curricula in Home Economics, Medical Technology—Bacteriology Course, and Physical Education lead to the degree of Bachelor in Science.

## 1. ACCOUNTING

The required work may be completed in two years as a full-time student or in three years as a part-time student, with the approval of the adviser.

		Hours
Accounting	Accounting 1-4, 10, 11, 12, 13, 14, 15, 16, 17, 18	24
English	English 1, 2	6
Mathematics	Mathematics 10, 11	4 1/2 or 5 1/2
Physical Education	See pages 30-31 for requirement of requirement	2
Statistics	Statistics 17 or 18	1 1/2 or 2
Total	To be entered with the approval of the adviser	34

\* Total hours must be entered with the approval of the adviser.

## JOURNAL OF POST KEYNESIAN ECONOMICS

[illegible]

2. **SECONDARY—**same course

This course is a prerequisite for further training toward certification in medical technology. The topics are: the information technology. On Medical Technology Course.

[illegible]

#### 4. THEORETICAL BACKGROUND

The increases in demand for postsecondary education were 30 and 40% for women and men, respectively, between 1970 and 1980. The increases in demand for postsecondary education were 30 and 40% for women and men, respectively, between 1970 and 1980. The increases in demand for postsecondary education were 30 and 40% for women and men, respectively, between 1970 and 1980.

Category	Frequency	Percentage
Frequency	10, 15, 20	100
Percentage	10, 15, 20	100
Category	10, 15, 20	100

<sup>†</sup>Column can be removed with the addition of the water to the fermenter as described.



Mathematical		
Calculus	Mathematical Economics 1-4	4
Physics	See page 67-68 for statement of requirements	4
Chemistry	Physics 5, 6, 7, 8, 10	12
Biology	Chemistry 1, Economics 1-4 (optional)	1-14
Total		34

### 2. DEPARTMENTAL STUDIES

		Hours
English	English 1, 2	2
	English 10-11, 12-13, 14-15	6
Physical Education	See page 67-68 for statement of requirements	4
Departmental Studies	Departmental Studies 1, 2, 13, 14, 15, 16, 17, 18	14
Other Studies	Departmental Studies 1-12, 13-14, 15-16, 17-18, 19-20, 21-22, 23-24, 25-26, 27-28, 29-30, 31-32, 33-34, 35-36, 37-38, 39-40, 41-42, 43-44, 45-46, 47-48, 49-50, 51-52, 53-54, 55-56, 57-58, 59-60, 61-62, 63-64, 65-66, 67-68, 69-70, 71-72, 73-74, 75-76, 77-78, 79-80, 81-82, 83-84, 85-86, 87-88, 89-90, 91-92, 93-94, 95-96, 97-98, 99-100, 101-102, 103-104, 105-106, 107-108, 109-110, 111-112, 113-114, 115-116, 117-118, 119-120, 121-122, 123-124, 125-126, 127-128, 129-130, 131-132, 133-134, 135-136, 137-138, 139-140, 141-142, 143-144, 145-146, 147-148, 149-150, 151-152, 153-154, 155-156, 157-158, 159-160, 161-162, 163-164, 165-166, 167-168, 169-170, 171-172, 173-174, 175-176, 177-178, 179-180, 181-182, 183-184, 185-186, 187-188, 189-190, 191-192, 193-194, 195-196, 197-198, 199-200, 201-202, 203-204, 205-206, 207-208, 209-210, 211-212, 213-214, 215-216, 217-218, 219-220, 221-222, 223-224, 225-226, 227-228, 229-230, 231-232, 233-234, 235-236, 237-238, 239-240, 241-242, 243-244, 245-246, 247-248, 249-250, 251-252, 253-254, 255-256, 257-258, 259-260, 261-262, 263-264, 265-266, 267-268, 269-270, 271-272, 273-274, 275-276, 277-278, 279-280, 281-282, 283-284, 285-286, 287-288, 289-290, 291-292, 293-294, 295-296, 297-298, 299-300, 301-302, 303-304, 305-306, 307-308, 309-310, 311-312, 313-314, 315-316, 317-318, 319-320, 321-322, 323-324, 325-326, 327-328, 329-330, 331-332, 333-334, 335-336, 337-338, 339-340, 341-342, 343-344, 345-346, 347-348, 349-350, 351-352, 353-354, 355-356, 357-358, 359-360, 361-362, 363-364, 365-366, 367-368, 369-370, 371-372, 373-374, 375-376, 377-378, 379-380, 381-382, 383-384, 385-386, 387-388, 389-390, 391-392, 393-394, 395-396, 397-398, 399-400, 401-402, 403-404, 405-406, 407-408, 409-410, 411-412, 413-414, 415-416, 417-418, 419-420, 421-422, 423-424, 425-426, 427-428, 429-430, 431-432, 433-434, 435-436, 437-438, 439-440, 441-442, 443-444, 445-446, 447-448, 449-450, 451-452, 453-454, 455-456, 457-458, 459-460, 461-462, 463-464, 465-466, 467-468, 469-470, 471-472, 473-474, 475-476, 477-478, 479-480, 481-482, 483-484, 485-486, 487-488, 489-490, 491-492, 493-494, 495-496, 497-498, 499-500, 501-502, 503-504, 505-506, 507-508, 509-510, 511-512, 513-514, 515-516, 517-518, 519-520, 521-522, 523-524, 525-526, 527-528, 529-530, 531-532, 533-534, 535-536, 537-538, 539-540, 541-542, 543-544, 545-546, 547-548, 549-550, 551-552, 553-554, 555-556, 557-558, 559-560, 561-562, 563-564, 565-566, 567-568, 569-570, 571-572, 573-574, 575-576, 577-578, 579-580, 581-582, 583-584, 585-586, 587-588, 589-590, 591-592, 593-594, 595-596, 597-598, 599-600, 601-602, 603-604, 605-606, 607-608, 609-610, 611-612, 613-614, 615-616, 617-618, 619-620, 621-622, 623-624, 625-626, 627-628, 629-630, 631-632, 633-634, 635-636, 637-638, 639-640, 641-642, 643-644, 645-646, 647-648, 649-650, 651-652, 653-654, 655-656, 657-658, 659-660, 661-662, 663-664, 665-666, 667-668, 669-670, 671-672, 673-674, 675-676, 677-678, 679-680, 681-682, 683-684, 685-686, 687-688, 689-690, 691-692, 693-694, 695-696, 697-698, 699-700, 701-702, 703-704, 705-706, 707-708, 709-710, 711-712, 713-714, 715-716, 717-718, 719-720, 721-722, 723-724, 725-726, 727-728, 729-730, 731-732, 733-734, 735-736, 737-738, 739-740, 741-742, 743-744, 745-746, 747-748, 749-750, 751-752, 753-754, 755-756, 757-758, 759-760, 761-762, 763-764, 765-766, 767-768, 769-770, 771-772, 773-774, 775-776, 777-778, 779-780, 781-782, 783-784, 785-786, 787-788, 789-790, 791-792, 793-794, 795-796, 797-798, 799-800, 801-802, 803-804, 805-806, 807-808, 809-810, 811-812, 813-814, 815-816, 817-818, 819-820, 821-822, 823-824, 825-826, 827-828, 829-830, 831-832, 833-834, 835-836, 837-838, 839-840, 841-842, 843-844, 845-846, 847-848, 849-850, 851-852, 853-854, 855-856, 857-858, 859-860, 861-862, 863-864, 865-866, 867-868, 869-870, 871-872, 873-874, 875-876, 877-878, 879-880, 881-882, 883-884, 885-886, 887-888, 889-890, 891-892, 893-894, 895-896, 897-898, 899-900, 901-902, 903-904, 905-906, 907-908, 909-910, 911-912, 913-914, 915-916, 917-918, 919-920, 921-922, 923-924, 925-926, 927-928, 929-930, 931-932, 933-934, 935-936, 937-938, 939-940, 941-942, 943-944, 945-946, 947-948, 949-950, 951-952, 953-954, 955-956, 957-958, 959-960, 961-962, 963-964, 965-966, 967-968, 969-970, 971-972, 973-974, 975-976, 977-978, 979-980, 981-982, 983-984, 985-986, 987-988, 989-990, 991-992, 993-994, 995-996, 997-998, 999-1000	14
Total		54

### Examination for Working (or Academic) Requirements

A student desiring to meet a required course may take such examination as the department prescribes, and on passing satisfactorily he may be entered in the next semester in that subject and may credit the his requirement in an advanced course. Passing this examination does not credit the student in any degree of credit toward the degree. A student desiring to take such examination should make written request of the dean and pay the required fee at the Office of the Treasurer before the date of the examination specified in the University catalogue.

### Honors

The degree of Bachelor in Arts or Bachelor in Science may be conferred "with distinction" upon the student who has a cumulative point average of 85 or higher, provided that student has been in residence at the University for at least 15 or which must have been taken in the Junior College or otherwise the student is satisfied.

<sup>1</sup> The student who has been in residence at the University for at least 15 or which must have been taken in the Junior College or otherwise the student is satisfied.

## COLUMBIAN COLLEGE

## THE FACULTY AND STAFF OF INSTRUCTION •

Cathie Hartmann, Linn. Ph.D. from Columbia College

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 James Henry Taylor, Ph.D., *Professor of Mathematics*  
 Oscar Lewis Roney, Ph.D., M.Ed., *Professor of European History*  
 Warren Reed West, Ph.D., *Professor of Political Science*  
 Francis Edgar Johnson, Ph.D., *Professor of Mathematics*  
 LeRoy Wilbur Pace, Ph.D., *Professor of Biochemistry*  
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 Wood Camp, Ph.D., *Professor of American History*  
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 Ira Samuel Harris, Ph.D., *Professor of Zoology*  
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 Carl Solihary Tegen, Ph.D., *Professor of English Literature*  
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 Myron Lee Koenig, Ph.D., *Professor of American History*  
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 Arden Maurice Gibbs, Ph.D., *Professor of American*

\* On December 16, 1997, the Commission on the Status of Women, 52 Years of the United Nations, 4th Session, 4th Meeting, at Geneva, in cooperation with the United Nations Development Fund, United Nations Population Fund, and United Nations Children's Fund, held a day of discussion on women's issues.

- Charles Edward Gause, M.A.B., Ph.D., *Dean Professor of Pathology*  
 Ira Beckwith Telford, Ph.D., *Professor of Anatomy*  
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 Charles William Cobb, Ph.D., *Professor of American Literature*  
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 Elmer Paul Chubbuck, A.B., Y.A.B., *Associate Professor of Religion*  
 Lewis Dink, Ph.D., *Associate Professor of Physics*

\* On editorial leave during summer term of 1924.  
 † On editorial leave during 1924.

\*Amel Bessy Treisman, Ph.D., *Lecturer in Psychology at Brunel University*

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High-Low Lattices, A.M., *Complexity, Patterns of Political Change*

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James Earl Ray, Ph.D., *Assistant Professor of Criminal Justice*Richard Wallace Southern, Ph.D., *Assistant Professor of Education*

Chen, H. Y. H., P. G. P. *Journal of Polymer Science: Part A: Polymer Chemistry*

Lawrence Patricia Leifer, A.M., Lawrence Leifer, Jr., *Dea.*

Robert Harold Schmitt, Ph.D., *Journal Editor of Philosophy*[illegible]

Three Daily Columns:

AP/IB courses: 1 year of AP/IB Biology

**Table 1**

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1

Received 28 June 2006

Source: U.S. Census Bureau, *Current Population Reports*, 1990.

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Following is a list of the



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Calvin Dickinson, *Chairman*

Edith Elizabeth Morrison, *Secretary*

Miss Thomas Lohr

Charles William Cobb

Edward Ellis Turner, Jr.

COMMITTEE FOR THE USE OF COLLEGE FUND

Robert Hamilton, *Chairman*

George Francis Higgins, Jr.

Edmund Hamilton Mearns

Alfred Hays Maclean

Robert Emerson Wilson

COMMITTEE ON RESEARCH

Harvard Allen, *Chairman*

Howard Stanton Wiers

Harvard Mearns Mearns

James Allen

John Palmer Young, Jr.

COMMITTEE FOR STUDENT

The Board of the College, *Chairman*

Frederick Taylor

Edmund Hamilton Mearns

Edith Elizabeth Morrison

Richard Walter Harbison

GENERAL INFORMATION

INTRODUCTION

Columbian College was founded in 1862. James Madison, then President of the United States, acted on obtaining the charter from Congress which established "The Columbian College in the District of Columbia" for the "sole and exclusive purpose of educating youth in the English, French and German languages, the liberal arts, sciences and literature" with full power to confer all degrees "usually granted and conferred in colleges".

In 1920, when the James College was established, the name "Columbian College" was transferred upon the same college at that time.

THE COLUMBIAN COLLEGE PROGRAM

Columbian College is that branch of the University which grants the Bachelor's and Master's degrees in the liberal arts. Its purpose is to enable the student to develop harmoniously both his particular abilities and his general education as a human being. It demands of the student a thorough acquaintance with our major areas of learning and at the

must have an understanding of how this field of specialization fits into the larger context of the scientific world, and social problems which concerned modern man. It must not merely impresses but that broader enlightening perspective which encourages its graduates to grow through the years in *polite* and *utile*.

The program is a comprehensive education in the liberal arts tradition. A particular vitality and meaning are imparted to it by the fact that The George Washington University is situated in the cosmopolitan capital city of a nation in which, increasingly, the world looks for leadership. Here, naturally, the liberal arts tradition is put to the test in contact with reality.

#### REGULATIONS

*Students in Columbian College are subject to, and are entitled to, University Regulations with the exception regarding Admission, Degree Matters. These are indicated above on pages 17-18, and the University regulations found on page 27-32.*

#### REQUIREMENTS

It is assumed that a student entering Columbian College has met the requirements of the Junior College under the Arts and Letters curriculum as the former institution. (After the Junior College studies at the University.) Following is a summary of these requirements.

*The Arts and Letters curriculum:* (1) English composition (2 semester hours) and an additional year course (2 semester hours) in English, American, European, Classical, or any other foreign literature. (2) Two college years (or four semester hours) of a single foreign language on the equivalent first foreign language requirement, except Greek, are required. A transfer student who has had foreign language courses in previous institutions earning 4 or 5 credits a week may have accepted as much as 12 semester hours in a foreign language without having taken four semesters (two full years). Such a student is required to take additional work time in the same language until he has completed four semesters for an equivalent minimum of high school years and college semesters. (3) At least one year (2 semester hours) in social studies, chosen from foreign or domestic in History, Political Science, Economics, Sociology or Geography, is required. (4) At least one year (two semester hours) of a laboratory science (Biology, Botany, Chemistry, Geology, Physics, or Zoology) is required.

The remaining hours of the Junior College program (roughly a minimum of 23 to 24 hours) should be devoted to the particular courses required by the community college institution. The student following the

environmental staff in the course of instruction acting as the CAY (teacher) or recommended by the advisors in the field of study major (see syllabi prepared by the respective advisors), together with supplementary courses. Electives in Art, Philosophy or Religion are recommended.

The Science curriculum requirements in English are the same as those of the Arts and Letters curriculum. A year course in social study is required. The foreign language requirement is the same as for the Arts and Letters curriculum, except that French or German is optional. At least 15 summer hours in Mathematics must be taken; additional work in Mathematics is restricted to prospective majors in Chemistry or Physics in which the student should take courses in both biological and physical sciences, leading to what the pre-requisites stated by the department under which he enrolls he must as well as specified prerequisites in science departments (such as Mathematics and Chemistry for majors in Physics or Mathematics and Physics for majors in Chemistry).

A transfer student admitted to Columbia College with deficiencies in freshman or sophomore work (whether in science or in mathematics or physics), corresponding to the program outlined above, is required to begin to make up such deficiencies immediately upon admission to Columbia College, and to carry courses toward this end each semester until all the general education requirements described above are satisfied. Students transferring from the School of Engineering must complete the Columbia College requirements in science and in literature as prescribed in the Arts and Letters curriculum. Electives in Art, Philosophy, or Religion are recommended.

### ABSENCE OF WORK

A full-time student who is not on production may take no more than four (4) summer sessions hours. A student employed more than twenty-four hours a week, who is not on production, may take not more than two summer hours.

A full-time student whose quarter-point index is 1.00 or higher may not take more than sixteen summer hours. An employed student with more than twenty-four hours a week may take not more than twenty summer hours.

A student previously employed who accepts employment subsequent to registration or at any time during a semester is required to report that fact immediately to the Dean, in order that adjustments in schedule may be made, if necessary, so that his program within the Faculty's limitations from the amount of work to be carried by an employed student.

## ATTENDANCE

The student is held responsible for all the work of the courses in which he is registered, and all students must be excused by the instructor in charge before absence is made for the student or made up for work missed. Excuses given in any course will lead to loss of credit in that course, even though other requirements, such as thesis, term papers, and examinations, are met.

## COMPLETION OF STUDIES

A student who has completed less than thirty semester hours in Columbia College, and who has registered his name at the Office of the Registrar is classed as a *junior*. A student who has completed thirty semester hours in Columbia College, including at least one course in his major, is classed as a *senior*. A student who has satisfactorily completed the work for the Bachelor's degree, and whose program of study has been approved and filed in the Office of the Registrar is classed as a *senior in degree*.

## INDEPENDENT STUDY PLAN

Under the independent study plan a student of demonstrated capacity, with special interest in the subject matter of a course, may be permitted to undertake independent study under the personal direction of an instructor, in accordance with the rules of the department or department concerned. Credit under this plan is limited to the specific courses only as designated in the list of courses of instruction in the Catalogue.

## ORGANIZATION AND HONORARY COUNSEL

No credit is given for work done by correspondence or in honorary courses.

## THE BACHELOR'S DEGREE

Upon the satisfactory completion of the undergraduate requirements in Columbia College, the degree of Bachelor of Arts or Bachelor of Science is conferred.

In connection with the School of Medicine a university certificate leading to the minimum degree of Bachelor of Arts and Doctor of Medicine is offered.

## ARRANGEMENTS FOR THE DEGREE

## Residence

For the residence requirements see page 87-88. Students desiring to transfer to Columbia College from a four-year granting institution of the University should meet with all the requirements necessary transfer within the University (see page 88 and 89).



• <http://www.pearsoned.com>

The course of grading and its preventing, wholeheartedly is directed to  
 toward to improve it and it.

In order to graduate, a student must have a general quality-point index of at least 2.0. In addition, the student with a Departmental Major must have a quality-point index of at least 2.0 in his major subject. Grades in courses taken at other institutions are not considered in computing the quality-point index. The student with a Double Degree Major must be in continuous enrollment for during the Major Examination.

To compute the quality-point index in the major, all student grades and foreign-grade courses in the major field taken at The George Washington University are included, even though minimum requirements for the major may have been completed, except when registration for graduate study is approved. Courses received in first-grade courses are not considered.

*Comments.*—A resident must maintain a quality point index of at least 80% on his placed-up problems. A resident receives no production as long as his quality point index is below 80% (or 90%) his production is counted by the Committee on Subspecialty.

**Definition 1.** A student who has a quality-point index below 1.00 is officially placed on probation for a third semester, whether necessary or not, and is ineligible to graduate.

A student suspended for poor scholarship may apply for readmission after an interval of one academic year. He must then submit evidence to the Committee on Admission and Advanced Standing that during his absence from the University he has so conducted himself as to indicate that he will profit by readmission. A student suspended twice for poor scholarship will not be readmitted.

The incoming scholarship rules are applied to a student with a limited scholarship only when he has undertaken a minimum of fifteen semester hours.

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The approximate requirements for the Bachelor's degree include at least sixty semester hours beyond the requirements of the Junior College (the curriculum in *Step* and *Junior* are in *Summary*) and the satisfactory completion of the courses. Each program must be approved by the major officer and by the Dean.

At least twenty-four summer hours of the last sixty summer hours toward the Bachelor's degree must be taken in college.\*

\* M. S. Gindoff, *Logic, Grammar, Critical Language and Language Teaching*, Pacific Institute for the Study of Language, University of California, Los Angeles, California, 1967.

included in the course field or department. The student should consult the notice section at each registration regarding the inclusion in his program of suitable limited electives.

**Except for students registered for the continuing degree at Bachelor of Arts and Doctor of Medicine, no more than twelve semester hours of continuous credit may be included in the last hundred and twenty-five semester hours required for the Bachelor's degree in Columbia College.** Columbia College students studying professionally cannot under this rule count toward the required, in addition, of the Dean's Council at Columbia College. Ordinarily courses in Physical Education and Historical courses in Education will not be approved for credit toward a degree in Columbia College.

After selecting a curriculum, a student may not change his studies except by permission of the Dean and on condition that he fulfill the requirements of the curriculum by which he changes until such an effort as the Dean the change is approved by the Dean.

Each student is required to select and file with the Registrar a choice of major upon entering Columbia College. He may change his major only with the consent of the Dean and of the department he intends to transfer to, and upon such the requirement for the new major which he is to enter as the Dean the change is approved by the Dean.

Good general courses may be treated as supplementary to undergraduate major programs and because of their interdisciplinary character may not be counted as part of such programs. (See "Explanation of General Studies.")

Students transferring from other institutions or from other college colleges or divisions to this University will transfer credit courses which are substantially met with satisfaction, be treated as complete satisfactorily at least under previous laws of approval with the course field in Columbia College or under University's Bachelor's degree. This work will count as part of the minimum course requirement.

**Examination for Meeting Continued Requirements.**—A student intending to enter a required or recommended course may enter such examination in the department procedure, and, on passing satisfactorily, he may be relieved of the requirement or preliminary requirement in that subject and may readily be recommended for advanced course. Passing of the examination shall not entitle him to any credit toward a degree. A student desiring to take such examination should make written request of the Dean and pay the required fee at the Office of the Treasurer before the date of the examination specified in the University calendar.

**Use of Common English.**—Any student whose English is not strong whenever it is found unsatisfactory may be requested by the instructor to the Dean, and by the Committee on the Use of Common English. The Chairman of the Committee may assign supplementary work without

scholarly credit, varying to correspond with the needs of the student. If the work prescribed is equivalent to a major, the regular tuition fee is waived. The granting of a degree may be delayed by failure to make up one's work satisfactorily in English to the satisfaction of the Committee on the Thesis.

#### GRADUATE SCHOOL EXAMINATIONS

During the final semester of the senior year students in Columbia College are permitted to take the following Graduate School Examinations: the *Advanced Exam*, which involves a measure of general scholarship as the graduate level; and *Area Tests* (achievement), which measure breadth of knowledge and understanding in three broad areas of the liberal arts: Natural Science, Social Science, and the Humanities. For further information concerning the Graduate School Examinations, see page 285.

#### DEGREE PROGRAMS

##### Bachelor of Arts

The work of the junior and senior years, including a major in one of the following major fields, must be approved by the major advisor and by the Dean.

*Major Fields:* American Thought and Civilization; Art (1) Art History and Theory, (2) Drawing and Painting, (3) Sculpture and (4) Commercial Art; Biology; Botany; Chemistry; Economics; English Literature; French Literature; Geography; Geology; Germanic Languages and Literature; History; Journalism (News-Broadcast or Public Relations); Latin American Civilization; Mathematics; Philosophy; Physics; Political Science; Psychology; Religious Studies; Spanish American Literature; Spanish Literature; Speech (Speech or Dramatic Arts, Technical, Forensic).

*Combined Degrees of Bachelor of Arts and Doctor of Medicine:* A candidate for the combined degree of Bachelor of Arts and Doctor of Medicine must: (1) maintain the Medical School entrance requirements (see pages 19-22); (2) fulfill the Junior College Arts and Letters requirements (see page 86); (3) fulfill the Columbia College residence requirement of at least thirty academic hours; (4) obtain the approval of the Board of Columbia College at the time of entering the School of Medicine; (5) obtain the recommendation of the Dean of the School of Medicine at the completion of all prescribed courses in the first year of the School of Medicine, at which time the degree of Bachelor of Arts will be conferred (graduation work taken at another institution will





The *Field-of-Study Major* places special emphasis on the intellectual development of the individual student. Progress in the major subject may vary, depending upon the individual student's background, previous work, reading habits, and aptitudes. The student is expected to consult his adviser frequently, and the special encouragement offered in the field gives him further opportunity for individual advice and assistance in pursuing a program especially tailored to his needs and abilities. A close student-adviser relationship is essential for the student's success under the *Field-of-Study Major* plan.

The following *Field-of-Study Majors* are offered: (1) American Thought and Civilization, (2) Biology, (3) English Literature, (4) French Literature, (5) History, (6) Latin American Civilization, (7) Philosophy, (8) Spanish American Literature, (9) Spanish Literature, (10) Statistics, (11) Zoology.

The major in Biology covers broadly over the field of Biological Science and deals in American Thought and Civilization and in Latin American Civilization courses studies in two areas, those of Languages and Literatures and of Social Science. The other *Field-of-Study Majors* with the exception of the major in Spanish American Literature, require departmental courses in their respective fields. A candidate for a Bachelor's degree with a major in Biology, English Literature, French Literature, History, Philosophy, Spanish American Literature, Spanish Literature, Statistics, or Zoology must elect a *Field-of-Study Major*.

#### Thesis in the Major

For the convenience of the student a *proseminar* is offered in each field of study. This course, planned and administered by the professor in closest responsibility for the field, will advise, guide, and instruct the student in his reading, study, and laboratory activities in order to assist him in gaining a coordinated knowledge of his field. It is a presentation of the content and methods of the major field as a whole through the organization and coordination of the knowledge obtained in the various related courses in the major subject and of material not usually included in such courses. This course is not required for students here, but no qualitative grade may be assigned. When registered in this course, the student will have the privilege of writing, subject to the approval of the instructor, any other appropriate course offered in the College. (High class standing is a prerequisite for credit or as an auditor, requires registration and payment of tuition.) *Theseminars* are open only to the student who has been accepted as a candidate under that specific major.

#### The Major Examination

The *Major Examination* will normally be taken by the student at the close of the senior year in the case of a student on a limited schedule.

the Major Examination may be taken any earlier than one semester prior to graduation. A student who fails to pass a Major Examination will be deferred to the following College Committee on Studies, or reinstated as a first regular winter examination period. The Committee on Studies will have general oversight of the proposals, making and grading of Major Examinations. Major Examinations will be held each semester as listed here for the department or departments concerned, but never more than January or for the last semester, May or for the spring semester, and August or for the summer session.

#### Departmental Majors

*Departmental Majors* will be *Field of Study Majors*, yet specifically defined in terms of credit hours, content, content, and the attainment of a quality score below of at least 2.0 in all second group courses taken in the major field. The minimum specific requirements for Departmental Majors are listed below the bulk of discussion of the Department concerned in the volume of the University Catalog for courses of instruction. The Executive Officer of the Department, or designated departmental officer, should be consulted in reference to departmental planning, content of courses, and the same program, including admission, must be approved by the Department. The student is then required to consult the Executive Officer or other in all matters affecting his progress of studies, such as degree, admission, withdrawal, and generally regarding his progress in his course. As far as possible the close administrative relationship described in the Field of Study Major will be maintained also in Departmental Majors.

List below are the Departmental Majors will be offered in the following: 1st (1) Art History and Theory, 2nd Drawing and Painting, 3rd Sculpture, and 4th Commercial Art, 5th Business Administration, 6th Economics, 7th Foreign Languages, 8th General Education, 9th Languages and Literatures, 10th Journalism, 11th Public Relations, 12th Mathematics, 13th Physical Science, 14th Psychology, 15th Religion, 16th Sociology, 17th Speech, 18th Theater, 19th Visual Arts.

#### THE MAJORS DEGREE

Thus, the graduation conditions of the graduate programs of Columbia College, the degree of Master of Arts or Master of Science is conferred.

#### DEGREE OF THE MAJORS DEGREE

The study leading to the degree of Master of Arts or Master of Science is a comprehensive survey of a field of knowledge. It is a preparation to the work of the graduate student and involves a process of preparation with scholarly method.

The student must satisfy certain minimum requirements as to previous education, residence, ability to read an approved modern foreign (European) language, and scores taken for these requirements, while enrolled, are regarded generally as qualifying measures. The student's knowledge of his field, as demonstrated by his thesis and by the results of the Master's Examination (together with such other examinations involving special skills as exist in the department or the Columbia College Committee on Studies may require), is the basis upon which the Master's degree is awarded.

#### MASTER IN ARTS

Students work leading to the degree of Master of Arts is offered in the following fields:

American Literature and Cultural History, Bibliology, Bibliography, Biology, Botany, Chemistry, Chondrology, Economics, English and American Literature, English Literature, French Literature, Geography, Geology, German Literature and Literature, History, Latin American Literature, Mathematics, Pharmacology, Philosophy, Physics, Physiology, Political Science, Psychology, Religion, Religious Education, Sociology, Spanish American Literature, Spanish Literature, Speech Communication, Zoology.

Special programs involving coordinated work in two or more departments may be arranged with the approval of the department concerned and the Columbia College Committee on Studies.

#### MASTER IN SCIENCE

Students work leading to the degree of Master of Science is offered in the following fields:

Biology, Bibliology, Bibliography, Biology, Botany, Chemistry, Chondrology, Geology, Mathematics, Pharmacology, Physics, Physiology, Psychology, Zoology.

Special programs involving coordinated work in two or more departments may be arranged with the approval of the department concerned and the Columbia College Committee on Studies.

#### REQUIREMENTS FOR THE DEGREE

##### RESIDENCE

Normally, an academic year of residence in Columbia College is required for completion of a minimum of thirty semester-hours of work including the thesis, which is counted as the equivalent of six semester-hours of course work. Summer work may be counted in residence, but



is not more than the period of residence appropriate to these requirements. Not more than twelve semester hours (which must be approved in advance by the Deans of Columbia College) may be taken in another school or division at this University, and such work may not be counted toward both a degree at that school or division and the Master's degree in Columbia College. No part of the minimum requirement may be taken elsewhere. All work for the degree of Master of Arts in History at Columbia must be completed within a maximum of three years, unless the Board of Trustees modifies the requirements as viewed in its judgment of time.

#### STUDENT STATUS

A Master's candidate must receive the grade of "E" (Excellent) in at least six semester hours of the course requirements for the degree in order to receive the Master's degree.

A student whose scholarship is satisfactory may be recommended by the Board upon recommendation of the department faculty which the student is attending. A Master's candidate who accumulates nine semester hours or more in "C" and "D" in his course in preparation toward the degree will be automatically dismissed. Honoring the student at any time is not an act of aid.

#### PROGRESS OF STUDY

The student's progress in his course may be reviewed by him at the request of his work in Columbia as shown possible at the Office of the Dean. Each program is subject to the approval of the department and the appropriate members of the Columbia College Committee on Studies. The program may be revised as the student's condition and his changing interests and interests of the professoriate may justify.

The candidate for the Master's degree will receive two semesters of credit in the field of his choice. Any student, however, whose satisfactory progress toward his degree is shown at least one full year of work is with in the following terms of work: (I) satisfactorily or better (with an average of 80% or more), (II) satisfactory or better (with an average of 70% or more), and (III) the minimum (with an average of 60% or more). These three terms of work make up the minimum in the general education history, being subject to modification for the Master's degree. The last provision has not only to modification for the Master's degree.

During graduate study, the student may not be received toward the Master's degree, but may be actually admitted to receive as a basis for advanced work. At least six semester hours of the course work required for the Master's degree must be taken in courses numbered over 600. Credit toward the degree may be received toward the degree, provided



the completion of additional work has been certified by the appropriate officer of instruction. (See "Explanation of Course Numbers".)

A student who expects to continue his studies for the degree of Doctor of Philosophy when receiving the Master's degree is strongly advised to complete his program from the beginning that week for lower degrees and help to prepare him for the higher.

### FOREIGN LANGUAGE REQUIREMENT

Before being admitted as candidate the student must show that he has a reading knowledge (certified by the appropriate foreign-language department) of at least one modern foreign (European) language, chosen by the department or committee under which he is studying. A student whose field is a modern foreign language or literature must add that language to completion of the reading knowledge requirement. Any Master's candidate who chooses to meet the Master's language requirement in French, German, or Spanish and has not passed the French, German, or Spanish foreign language examination by the end of the first semester must register for French 40, German 40, or Spanish 40 at least at his next registration. The Master's reading requirements will be given at the first class meeting of French 40, German 40, and Spanish 40, made at the end of the course, just as the last lecture of the January Term. These examinations are given to all Master's candidates, whether enrolled in the courses or not. However, a candidate not enrolled who wishes to present himself for any of the required scheduled examinations should notify the Dean at least a week in advance. Those enrolled in French 40, German 40, or Spanish 40 who pass the first examination are excused from the course and will receive a refund of tuition. Students who expect to take a reading examination in any modern language other than French, Spanish, or German should notify the Dean at the time of registration.

Students are excluded of the masters for early withdrawal at the requirement, normally not later than the end of the first semester of registration for the degree.

### ADMISSION TO CANDIDACY

A student must be admitted as candidate before he begins the last half of his work for the Master's degree, i.e., not later than the completion of the second semester of degree courses. Application for admission to candidacy is made on a form obtained at the Office of the Dean and must be approved by the appropriate representative of the department or committee and by the Dean. If a prospective candidate in his previous academic work has not satisfactorily satisfied the requirements for the

Master's degree, including the undergraduate study as defined by the appropriate department or committee, he will not be admitted to candidacy until such deficiency has been made up. He may make up his deficiencies by earning appropriate credits in addition to those counted toward his degree.

### THE MASTER'S THESIS

The thesis may be of a research, expository, critical, or creative type. The most purpose of a Master's thesis is to demonstrate the student's ability to make independent use of the information and training acquired through his other disciplines, and to furnish objective evidence of his constructive powers in his chosen field. Registration for the thesis must be on file from the beginning of the last year of preparation, when the professor in charge of the thesis grants registration at the beginning of the first semester. The choice of the thesis subject must be approved by the professor in charge of the student's field and entered in the Office of the Registrar by the date announced in the University calendar. Registration for the thesis is automatically made on the basis of three hours per unit of full-time graduate coursework. In exceptional cases, and with the approval of the professor in charge of the thesis, the student may register for the entire six hours during a single semester. The type of thesis must be so filed from must be submitted by the student for the approval of the professor in charge of the student's field and of the appropriate committee not later than the date announced in the University calendar. Requirements regarding the form of the thesis are stated on page 73, and pertinent information will be supplied by the Dean.

Students of history for the thesis receive the candidate, during the summer year of preparation, in the office and direction of the member of the faculty under whom the thesis is to be written. In case a thesis is submitted on additional coursework, students may also be granted up to six further bonus periods. If the completion of the thesis extends beyond the previous period the student must register for it again, and not count on the previous one for a required course.

### THE MASTER'S EXAMINATION

In addition to such other examinations as may be required, the candidate must pass a general written examination on the major subject. Examinations will be held on June 15 for the department of economics; not in any case later than January 15 for the fall semester, May 15 for the spring semester, and August 1 for the summer semester. The professors of the field through which the undergraduate student which answers the general examination for the master also apply to the Master's Exam-

leave. A candidate who fails to pass the Master's Examination may, in exceptional circumstances and with the specific approval of the Coleridge College Committee on Studies, repeat the examination, but only once in the same or next session. If he fails a second time, no further opportunity to take the examination will be permitted.

## THE GRADUATE COUNCIL

ARTHUR EDWARD BROWN, Ph.D., *Chairman of the Graduate Council*

### MEMBERS OF THE COUNCIL\*

Joseph Hyatt Roe, Ph.D., *Professor of Biochemistry*  
 James Henry Taylor, Ph.D., *Professor of Mathematics*  
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 Warren Earl Wain, Ph.D., *Professor of Political Science*  
 Francis Edgar Johnson, Ph.D., *Professor of Mathematics*  
 Robert Wilson Parr, Ph.D., *Professor of Botany*  
 Benjamin Douglas Van Epps, Ph.D., LL.D., *Professor of Chemistry*  
 Marshall Dymally, Ph.D., *Professor of Educational Psychology*  
 Winifred Ouellette, S.B., M.D., LL.D., S.H.D., *Professor of Psychiatry*  
 Marie Irving Freeman, Ph.D., *Professor of Biological Anthropology*  
 Helen Dale Kennedy, Ph.D., *Professor of Botany*  
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 Paul Edmund Smith, Ph.D., *Professor of Pharmacology*  
 Samuel Nathaniel Weiss, Ph.D., *Professor of Chemistry*  
 Charles Rudolph Young, Ph.D., *Professor of Chemistry*  
 Howard Maxwell Morrison, Ph.D., *Professor of American Diplomatic History*  
 Fred Sullivan Young, Ph.D., *Professor of English Literature*  
 Charles Edward Loring, Ph.D., *Prof. Professor of Physiology*  
 Donald Lawrence Wain, Ph.D., *Professor of Economics*  
 Angus Malcolm Gault, Ph.D., *Professor of Botany*  
 Caroline Emmott Threlkeld, Ph.D., *Professor of Biochemistry*  
 Ira Frederick Tolson, Ph.D., *Professor of Zoology*  
 Robert Dale Campbell, Ph.D., *Professor of Geography*  
 Kenneth Holton Thorne, Ph.D., *Professor of American History*  
 Wolfgang Heinrich Koenig, Dr. Jur., LL.D., *Professor of Political Science*  
 William Frederick Raper, Ph.D., *Professor of Chemistry*

\*The President of the University, the Dean of Students, and the Registrar of the University are members of the Council.  
 \*The Council of students and faculty is organized.



- Arnold Kohns, A.M., *Associate Professor of Science*  
 George Edward Fathall, Ph.D., *Associate Professor of Psychology*  
 Richard Emerson Wood, Ph.D., *Assistant Professor of Chemistry*  
 Mary Louise Robbins, Ph.D., *Assistant Professor of Bacteriology*  
 Harold George Merrill, Ph.D., *Assistant Professor of Pharmacology*  
 Don Carlos Lyall, Ph.D., *Associate Professor of Educational Psychology*  
 William Columbus Davis, Ph.D., *Associate Professor of Latin American History*  
 James Herman Moul, A.M., *Associate Professor of Psychology*  
 "Donald Bruce Thompson, Ph.D., *Associate Professor of Eastern History*  
 John Clinton Palmer, Ph.D., *Associate Professor of Science*

#### COMMITTEES OF THE UNIVERSITY

- Samuel Jacob All, Ph.D., *Assistant Chief, Department of Bacteriology, Communicable Diseases Division, Walter Reed Army Institute of Research; Bacterial Psychology and Nutrition*  
 Robert Watson Baldwin, Ph.D., *Professor Emeritus of American Literature; Literary Nationalism*  
 George McSpadden Briggs, Ph.D., *Chief, Nutrition Unit, Laboratory of Endocrinology and Nutrition, National Institute of Arthritis and Metabolic Diseases; Animal Nutrition*  
 Bernard Paul Brink, Ph.D., *Chief, Laboratory of Chemical Pharmacology, National Heart Institute; Biochemical Detoxication*  
 Charles Benjamin Brown, Ph.D., *Professor Emeritus of Physics; Education*  
 Dean Buck, Ph.D., *Head, Cardiovascular Unit, National Cancer Institute; Tissue Respiration in Biochemistry*  
 Robert William Clark, Ph.D., *Chief, Department of Surgical Physiology, Walter Reed Army Institute of Research; Hemodynamics*  
 Clifford Colin Dr. rer. pub., *Chief, Educational National Planning Association; Public Finance; National Income*  
 Lloyd Gratton Evans, A.M., LL.D., LL.B., *Professor Emeritus of Romance Languages; Romance Linguistics; Old and Middle French; Old English*  
 Florence Nathan Franklin, Ph.D., *Professor, Applied Physics Laboratory, The Johns Hopkins University; Acoustics*  
 Carl Lawrence Hays, Ph.D., *Office of German and Austrian Affairs, Bureau of German Political Affairs, United States Department of State; International Politics and Organization*

- Adrian Kuttack, Ph.D., *Chief, Research and Development Division, United States Department of Health, Education, and Welfare, Analysis.*
- William Louis Moore, Ph.D., *Pharmacology Division, National Bureau of Standards, Theoretical Center.*
- James Jacobus Fink, Ph.D., *Deputy Director, Research Department, International Monetary Fund, International Economics.*
- Charles Morley Branstetter, M.D., *Chief, Section on Pharmacology and Toxicology, National Institutes of Arthritis and Metabolic Diseases, Cardiovascular Branch.*
- Leonor Price Schell, Ph.D., *Chicago at Parks, United States National Museum, Vertebrate Zoology, Ichthyology.*
- Leonor Bradford Smith, Ph.D., *Assistant Director, Division of Pharmacology, Department of Biophysics, Pharmacology, University of Illinois, Urbana, Ph.D., Chief, Laboratory of Clinical Pharmacology, National Heart Institute, Silver Spring, Maryland.*
- Oliver Paul Volkmann, Ph.D., *Head, Radiobiology Branch, Naval Medical Research Institute, Bethesda.*
- Paul Mark White, Ph.D., *Professor, University of California, Theoretical Statistics, Probability, and Statistics, Applied Statistics, Economics.*
- Henry White, Ph.D., *Division, Division of Agriculture, Food and Drug Administration, Department of Health, Education, and Welfare, Agriculture.*
- William Paul Wright, D.V.M., Ph.D., *Chief, Division, United States Public Health Service, Chief, Laboratory of Tissue of Division, National Microbiological Institute, Farmington.*
- Edith Albert Young, Ph.D., *Director, Division of Research and Statistics, Board of Governors, Federal Reserve System, International Finance.*

## GENERAL INFORMATION

### INTRODUCTION

The Graduate Council offers a program of advanced study and research leading only to the degree of Doctor of Philosophy. It was established in 1929 to replace the Graduate School which had formerly administered work for the Master's as well as the Doctor's degree. The Graduate Council provides a liberal discipline which serves truly as an administrative line during the process of increasing the field of study. It gives personal supervision to a limited number of students, each of whom has the opportunity to conduct research, consultation, and research direction.

## FIELDS OF RESEARCH

The following fields of research have been authorized by the Graduate Council as those in which doctoral investigations and dissertations may be undertaken. The supporting fields of study required at all conditions for the degree of Doctor in Philosophy are specified for each individual student by his Consultative Committee before admission to study under the Council.

This list of fields is subject to such changes as the educational resources of the University may direct. The prospective student may address preliminary inquiries concerning his research interests to the members of the Council who is in charge of the field, or to the Chairman of the Division Council.

## Languages

(1) Greek Language (2) Hebrew

Yahudi

## Mathematics

Algebra, Geometry, and Trigonometry

Math

(1) Geometry (2) Trigonometry (3) Calculus, Statistics and Analysis

Algebra

(4) Probability (5) Statistics (6) Calculus, Statistics and Analysis

Calculus

## Physics

Classical and Modern

Classical

Modern

Modern

Relativistic Mechanics

Relativity

(1) Electrodynamics (2) Optics (3) Acoustics (4) Mechanics

Optics

(5) Thermodynamics (6) Statistical Mechanics

Thermodynamics

Quantum Mechanics

Quantum

Relativistic Mechanics

Relativity

## Chemistry

Physical

Physical

## Biology

(1) Botany (2) Zoology

Botany

Physiology

Physiology

## Geology

Physical

Physical

Historical

Historical

Biological

Biological

Chemical

Chemical

Mineral

Mineral

Geological

Geological

Historical

Historical

Biological

Biological

Chemical

Chemical

Mineral

Mineral

*Foreign*

- (1) *General Principles* (2) *History of Foreign Thought*
- (3) *Foreign Literature* (4) *Foreign Customs*
- (5) *Foreign Languages*
- (6) *Foreign History* (7) *Foreign Science*

*Geography*

*General Geography*

*History*

- (1) *General History* (2) *The Middle Ages* (3) *The Modern World*
- (4) *History of the United States*
- (5) *History of the United States*
- (6) *History of the United States*
- (7) *History of the United States*
- (8) *History of the United States*
- (9) *History of the United States*
- (10) *History of the United States*

*Law*

*International Law*

*Commerce and Languages*

- (1) *General Principles*
- (2) *General Principles*
- (3) *General Principles*
- (4) *General Principles*
- (5) *General Principles*
- (6) *General Principles*
- (7) *General Principles*
- (8) *General Principles*
- (9) *General Principles*
- (10) *General Principles*

*Mathematics*

- (1) *General Principles*
- (2) *General Principles*
- (3) *General Principles*
- (4) *General Principles*
- (5) *General Principles*
- (6) *General Principles*
- (7) *General Principles*
- (8) *General Principles*
- (9) *General Principles*
- (10) *General Principles*

*Philosophy*

- (1) *General Principles*
- (2) *General Principles*
- (3) *General Principles*
- (4) *General Principles*
- (5) *General Principles*
- (6) *General Principles*
- (7) *General Principles*
- (8) *General Principles*
- (9) *General Principles*
- (10) *General Principles*

*Science*

- (1) *General Principles*
- (2) *General Principles*
- (3) *General Principles*
- (4) *General Principles*
- (5) *General Principles*
- (6) *General Principles*
- (7) *General Principles*
- (8) *General Principles*
- (9) *General Principles*
- (10) *General Principles*



**Physiology**

(1) Blood Pressure Studies; (2) Heart-Muscle Studies	2 units
Endocrinology	1 unit
Neurophysiology	1 unit
Human Physiology	1 unit

**Political Science**

International Communications Government and Foreign Policy	2 units
Government: Administrative Policies and Organization	1 unit
Comparative Law: (1) War and Neutrality; (2) Arbitration	2 units
United States: (1) The Legislative Process; (2) Governmental Organization and Administration	2 units

**Psychiatry**

Medication Treatment (M.E. degree required for admission)	Continuing
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**Psychology**

Comparing and Contrasting	1 unit
Abstract Comparing and Contrasting	1 unit
Comparative Psychology	1 unit
(1) Psychological Abnormalities; (2) Abnormal Psychology	1 unit
Social Psychology	1 unit

**Statistics**

Intermediate Analysis	2 units
(1) Elementary Probability and Sampling; (2) Applied Statistics	2 units

**Writing**

Psychology: General, Program	2 units
Psychology: Psychology and Administration	1 unit
Psychology: Education	1 unit

**ADMISSION PROCEDURE**

For admission the student must possess adequate preparation for advanced study, including satisfactory Bachelor's and Master's degrees, or the equivalent, together with acceptable personal qualities and a capacity for intensive scholarship. Previous graduate study should have been in the same general field as that proposed for doctoral study.

Before entering, the student should have personal interviews with the Chairman of the Council and the professor in charge of the central field of study.

After application blank and transcripts of previous graduate training have been filed the student must demonstrate his ability to read either

French or German is the field of his major interest. Both French and German are required, without exception, but only one at the time of admission. The student then makes his personal selection of a minor which makes his recommendation to the Council. The committee then gives its advisory recommendation for the student's declared program.

#### STUDY FOR THE COUNCIL FOLLOW-UP EXAMINATION

The duration for the degree is divided into two stages. The first is made up of study in related fields of learning which support the general area of major concentration, culminating in the Council Follow-up Examination. The second stage is composed of research and investigation of a particular project in a special field and the presentation of such research in a written dissertation, culminating in the Final Examination.

At the beginning of the student's program of study leading to the Council Follow-up Examination, a committee consisting of members assigned to direct his work in a group of fields of learning, usually five or six in number, directs him to secure his breadth of knowledge and general preparation for serious scholarship, research, as well as to support the discipline proper to his chosen field. Members of the committee monitor the student pursuing the program and insure that their learning habits and will meet the student's preparation for his commitment to them.

This advanced study may be done by attending graduate courses at universities and centers of excellence with authority of the student's committee and by intensive study. The traditional, however, are made as guides for such but learning is the task and the student's ability to prove that the actual grasp of his chosen discipline. The committee is a series of sessions with weekly meetings over a period of one week. The entire purpose of a list is given in each part of the curriculum covering one of the fields of study in the student's program. If the member of the committee are confident the student is qualified to a Fellow of the Graduate Council, as proved by completed work and research under the supervision of a member of the Council.

#### RESEARCH, THE DISSERTATION AND THE FINAL EXAMINATION

After the student has been informed by a Fellow of the Council and his research program has been approved, he is recommended only as the member of the Council who directs his research project. As a Fellow he may select several members of the Council and assistants in the progress of research. However, the only commitment was to all the students' facilities of the University. When necessary, the Graduate Council intervenes in meeting the Fellow to meet other requirements.

desires to undertake his special study in connection with his doctoral dissertation.

The doctoral dissertation is required of all Fellows in evidence of ability to perform scholarly research and to interpret its results. An extended summary of the dissertation is published in a periodical volume by the University for distribution to other institutions and libraries. Final forms of printed regulations concerning the dissertation are supplied to all members of the University.

When the completed dissertation has been approved by the members of the Council in charge of the research project, the Fellow is presented for his final examination. This examination is read out once in the public. The committee of examiners includes not only members of the Council concerned in the research field or in closely related subjects, but also at least two qualified members from other research institutions brought to the University in partnership in the examination. If the Fellow satisfies the committee concerning the high quality and originality of his contribution to knowledge as well as his mastery of the scholarly and research techniques of his field, the Council recommends him for the degree of Doctor of Philosophy.

#### PROFESSORIAL STUDY

The Council expects its graduates to continue their interest in advanced study and research, and to contribute to its program. All graduates are listed as Associate Fellows and must respond with positive action of all general meetings. They may continue any studies in the University without payment of tuition and enjoy all University library privileges. Such graduates are required to pay only the usual residence fee in order to establish their active membership in the University. The use of laboratory space and equipment is contingent upon availability, and the cost of all laboratory or special library material is paid by the graduate. Special arrangements for such privileges must be made with the Chairman of the Council. Post doctoral work taken under this privilege may not be applied toward any degree offered by the University.

#### REGULATIONS

*Candidates and Fellows in the Graduate Council are subject to, and are required to familiarize themselves with, the regulations regarding Nominations, Term and Extension thereof in papers 10-11, and the University regulations cited on pages 12-13.*

#### REGULATIONS AS TO CONTINUING REGISTRATION

The Graduate Council expects all students to work on their doctoral programs in continuity, although there is no formal regulation concerning

His discussion focuses on the use of research study within an organization for the Council. Following transcription, it is a *Product* of the Council designed to forward research. His studies also acknowledge other parts of the chemical program as well as limited schedule issues. He provides a brief summary of regulatory concerns (continuous regulation under the Clean Air Act) even while the Council has granted a stay of action for such air emissions standards. Failure to monitor regulations is well beyond the subject's scope despite the multiple issues at the Council. In such case, the subject must simply be addressing to the Council, rather than any one committee but regulations are set up by an executive committee at the request of the Council who directs the research.

THEORY, EVALUATION, AND CONCEPTUALIZATION

A recent number of Training Fellowship are awarded annually to active participants of numerous seminars for foreign students organized under the Graduate Council. To assure effectiveness of instruction, graduate students are required to enter in the students program. Applications for Training Fellowships and graduate assistantships should be sent directly to the executive officer of the department involved regarding research, foreign or government and the title is forwarded here to be mailed for consideration.

A possible funding source for the National Council program would be a contract for technical services offered by the Council to be paid from requests for an Office of the Governor's Fund.



## THE SCHOOL OF MEDICINE

### THE FACULTY\*

#### *Dean of the School of Medicine*

Angus MacLean Giesbe, Ph.D., *Assistant Dean of the School of Medicine*  
Thomas Martin Perry, A.B., M.D., *Director of Postgraduate Instruction*

Joseph Hyman, B.Sc., Ph.D., *Professor of Biochemistry*  
Leland Wilbur Pace, Ph.D., *Professor of Bacteriology*  
Herbert Chaskalovic, A.B., M.D., Sc.D., L.H.D., *Professor of Psychiatry*  
Frederick S. Rosen, M.D., *Professor of Urology*  
Harry Paul Andrews, M.D., *Professor of Dermatology and Syphilology*  
Francis Alexander W. Lindsay, B.S., M.D., *Professor of Pediatrics*  
Selig Perlman, M.S., M.D., *Professor of Obstetrics and Gynecology*  
Robert Rubin, A.B., M.D., *Professor of Surgery*  
Paul Kenneth Smith, Ph.D., *Professor of Pharmacology*  
James William Wynn, B.S., M.D., *Professor of Neurological Surgery*  
Thomas Oswald Lane, Ph.D., *Vice Professor of Chemistry*  
Thomas M. Phelan, B.Sc., A.B., M.D., *Associate Professor of Medicine*

Angus MacLean Giesbe, Ph.D., *Professor of Biochemistry*  
Donald Adams Cox, A.B., M.D., *Professor of Ophthalmology*  
Thomas Martin Perry, A.B., M.D., *Professor of Pathology*  
William Wendell Stedman, M.D., *Professor of Radiology*  
Charles Oswald Wynn, B.S., M.D., *Professor of Physical Medicine and Rehabilitation*

Colman Raymond Trembly, Ph.D., *Professor of Biochemistry*  
Charles Seymour Coakley, M.D., *Professor of Anesthesiology*  
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Harold George Mantel, Ph.D., *Associate Professor of Pharmacology*  
Frank Nelson Miller, B.S., M.D., *Associate Professor of Pathology*  
William Emory McCann, A.B., M.D., *Associate Clinical Professor of Surgery*

\* The members of the University are listed in Families and the members of the University are listed in the University of the University.

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Victor Frederick Ludwig, A.B., B.S., Administrator of the University Hospital

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## GENERAL INFORMATION

## INTRODUCTION

The School of Medicine of The George Washington University was opened in March 1881 as the medical school and is connected to the University through its administrative and financial structure. The University Hospital and Dispensary were established in 1886 and were a part of the organization of the School.

The School is a member of the Association of American Medical Colleges and is one of the medical colleges which have been continuously approved by the American Medical Association. The degrees of the School of Medicine are recognized by all state licensing boards.

## PURPOSE AND AIMS

The purpose of the School of Medicine is to train physicians competent in the art and science of medicine, which includes general practice, further training for special practice, teaching, research, and medical administration.

On the undergraduate level the aims of the school are (1) to select and train students of superior aptitude and character; (2) to teach thoroughly the basic principles and in the laboratory and clinical application of the medical sciences; and (3) to provide a diversity of clinical experience with a wide range of clinical material, through well supervised clinical clerkships in hospital, public, and private hospitals providing facilities for all specialized fields of medicine.

The aims of the School of Medicine in the field of graduate and postgraduate education are (1) to provide intense and rigorous for a number of hospitals in the Washington area for advanced training in both general and specialized medicine; (2) to direct an expanding program of fundamental and medical research, integrated with teaching at the School of Medicine; and in keeping with the increasing need for medical knowledge and the growth of Washington as one of the nation's great centers of medical research; and (3) to provide postgraduate instruction in the most recent advances in research and in clinical medicine.

To achieve these objectives, the School of Medicine has developed its curriculum plan of intensive medical instruction and a balanced comprehensive curriculum. In carrying out its programs, the School seeks to maintain a balance of theoretical and practical training, to provide the most effective use of the expanding University facilities, and to hold full advantage of the exceptional opportunities for clinical and research training in the Washington area.



#### ORIENTATION PROGRAM

A distinctive curricular feature of the George Washington University School of Medicine is a program for the orientation of students entering the School which is given to them during the first week of the regular academic year. The aims of the program are: (1) to acquaint the student with the School of Medicine and with the faculty of the School of Medicine; (2) to bridge the gap between premedical and medical education; (3) to indoctrinate the student in the responsibilities and ethical principles upon which medical practice rests; (4) to help the student get an effective start in his medical studies.

The orientation course is given because it is recognized that students find medical school quite different from their previous college experience. The language is different, the problems are more detailed, and the demands upon the students in quality and quantity of work are far more exacting. It has been found helpful to point out to the student that it is not that they find the requirements are too rigorous, they are being trained for decisions which may mean suffering or well-being, life or death, for persons who ultimately will be under their care. The outline course in the orientation course includes an interpretation of the medical method by the President of the School, a survey of the relationship between premedical and medical education by a member of the Committee on Admissions, an introduction to the literature of scientific research, the history of the School of Medicine, the philosophy of the medical curriculum by the Chairman of the Curriculum Committee, an introduction to the Medical Library with guidance as how to use it by the Chairman of the Library Committee, a statement of the ideals and aims of the medical profession by the Dean, a brief survey in the history of medicine as related to the various preclinical and clinical subjects by heads of departments, a lecture on the relationship of the physician and the law by an eminent medical legal authority, a discussion of medical ethics and the patient-physician relationship, evaluation of various health programs, a presentation of basic scientific of health, and given by a Professor of Medicine, and practical advice to the students on how to study by a senior member of the faculty.

#### PLAN OF INSTRUCTION

The instruction is a graded one beginning with fundamental sciences of the basic sciences and progressing gradually into the clinical teaching at the last two years. The teaching is organized systematically under the various departments of the School of Medicine as listed under Courses of Instruction in this CATALOGUE.

During the first year the student receives instruction in anatomy, histology, and physiology, using the dissection and laboratory facilities.

of the School of Medicine. In order to emphasize the importance of the basic sciences, students are graded from time to time and the understanding of these fundamental sciences in the clinical sciences is stressed.

In the second year, having completed the preliminary study of the structure and function of the normal body, the understanding of disease is emphasized. The various bacteria and other microorganisms, agents capable of producing disease are studied in the laboratory. The effects of various diseases upon the tissues of the human body are taught in pathology, serving as a basis for the understanding of disturbed structure and function. The study of action of the various drugs and chemicals given is studied in the course in pharmacology as an introduction to the use of these agents in the treatment of patients. The student is taught to conduct a physical examination and to interpret and explain the various symptoms of disease. During the second semester of this year patients are assigned to him for case study under the close supervision of his instructor. Internship duties in medicine, surgery, pediatrics, obstetrics and gynecology, neurology, orthopedics, and psychiatry are given during this period, preparing the student for his responsibility and position in the hospital, practice and clinics.

In the third year the student is assigned to the Thomas Jefferson General Hospital for closely supervised clinical instruction. He serves as clinical clerk in the various divisions of the hospital and assists in the examination of the clinical records and takes laboratory examinations. He learns to perform the various special procedures and to use diagnostic and therapeutic equipment. During this period there are daily lectures and clinical demonstrations given at the various clinics, presenting basic studies in many medical problems.

During the summer period following the third year the student is required to spend eight weeks in one of the various teaching hospitals of the School of Medicine. This gives previous limited education, so that the student may acquire opportunities in the various specialties not previously included in the medical curriculum.

In the fourth year the student spends most of his time in one or more of voluntary practice. The instruction is given in the clinics of the Jefferson General, Children's Hospital, Mount Zion Hospital, Walter Reed General Hospital, and St. Elizabeths. In these various institutions students at the bedside continue to supervise the students in the evaluation of clinical problems by a careful review of each patient and case planning of treatment procedures. Every student uses the past individual and his environment, since it is recognized that every patient, emotional and conscious as well as physical, contributes to disease and must be considered if the individual is to be restored to health and efficiency. Instruction in the basic sciences is continued in the fourth

year in limited conferences in which representatives of several departments of instruction participate.

By the completion of his four-year course the student must have demonstrated that he has acquired the basic knowledge and experience necessary for advanced training in the internship.

### THE MEDICAL CURRICULUM

Subject	First	Second	Third	Fourth
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#### First Year

Preparatory	112	115	—	118
Chemistry and Physics	57	56	—	114
Physiology	57	54	—	55
Pathology	45	48	15	105
Pharmacology	44	47	11	105
Microbiology and Medical Entomology	15	—	—	15
Public Health	15	—	—	15
First Aid	15	—	—	15
Total	407	435	31	1,068

#### Second Year

Chemistry	74	144	15	233
Physics	74	144	15	233
Physiology	74	144	15	233
Pathology	74	144	15	233
Pharmacology	74	144	15	233
Microbiology and Medical Entomology	74	144	15	233
Public Health	74	144	15	233
First Aid	74	144	15	233
Preparatory	74	144	15	233
Chemistry and Physics	74	144	15	233
Physiology	74	144	15	233
Pathology	74	144	15	233
Pharmacology	74	144	15	233
Microbiology and Medical Entomology	74	144	15	233
Public Health	74	144	15	233
First Aid	74	144	15	233
Total	407	435	31	1,068

\* Chemical, physical, and first aid.





Open Clinics	1
Examinations	1
Total	2

## TEACHING AND FACILITIES

*The George Washington University Hospital.*—The hospital, with a complement of 200 beds, was burned as well. This splendid edifice, which is one of the outstanding hospitals in the United States, is completely furnished with the latest and most scientific apparatus and equipment. Its purpose is to supplement existing hospital resources in the District of Columbia and the area of the city and the suburbs; to provide facilities for the education of physicians, nurses, and technicians; and to promote medical knowledge.

The hospital is owned and controlled by the Faculty of the George Washington University School of Medicine and is providing excellent clinical material for the instruction of medical students. Virtually every specialty in the fields of medicine and surgery has assigned space and equipment in both the outpatient department and the inpatient service of this modern hospital.

*Medical School Building.*—The building housing the School of Medicine is a modern structure with lecture rooms, classrooms, students' rooms, and the following departments: anatomy, bacteriology, hygiene and preventive medicine, biochemistry, pathology, and pharmacology and therapeutics.

There are halls assigned to enable students to pursue individually the laboratory courses and to acquire the technical skill necessary in modern clinical and investigative work.

*Research Building.*—The Research Building houses special laboratories for graduate and postgraduate in the Departments of Anatomy, Biochemistry, Pharmacology, Physiology, and Bacteriology, Hygiene, and Preventive Medicine. Special facilities are provided for the study of infectious diseases, for cancer culture techniques, and for virological procedures. School students are invited to participate in various aspects of the research program either as a volunteer basis or with the support of special Research Scholarships.

On the first floor, the west wing is occupied by a modern medical library; the east wing houses the administrative offices of the School of Medicine. Photographic laboratory and other facilities for scientific work in education are on the second floor.

*Medical Library.*—The Medical Library is modern, well-equipped library on the first floor of 1400 H Street NW, since 1916 contains 14,000 carefully selected volumes, including the new medical works and the principal medical journals.

Inter-library loan service is maintained with other medical and scientific libraries.

The Medical Library is open from 9 a.m. to 12:30 p.m., each day, Monday through Friday, and from 2 p.m. to 5 p.m. Saturday.

A branch of the Medical Library is maintained in the University Hospital for the use of the resident physicians and interns.

#### Geographical Museum

The Armed Forces Institute of Pathology, on the grounds at Walter Reed Army Medical Center, admits unaffiliated investigators for study of material sent in general medicine and surgery as well as those of practically any other discipline. The collection of anatomical and pathological specimens continues to increase, received from all areas of the world and is unparalleled in this country. The Museum of Hygiene, the National Museum, the Smithsonian Institution, the Henry Grayson, and the various collections of the Department of Agriculture all afford opportunities for study of materials of special interest in various areas of Medicine and its allied sciences.

#### CLINICS

Students in the George Washington University School of Medicine receive clinical training at the University Hospital, at the main University Clinic, and at five affiliated hospitals. In the very first year the medical student begins his study in the hospital as well as in the lecture halls and classrooms.

*The University Hospital.*—All clinics are under the supervision of the House staff in the Medical Division of the Hospital. This insures the highest possible utilization of available clinical material for teaching purposes and the proper supervision of diagnosis and treatment; it brings the individual student into direct contact with patients and requires him to be under authoritative supervision. The clinical and laboratory work necessary for diagnosis and treatment and a thorough general knowledge of the conditions occurring during the progress of cases and treatment, the timing of laboratory studies. Clinical and clinical pathological conferences are held in which the theories of many of the principal findings, laboratory results, and the pathogenesis of pathology which are presented are reviewed.

*The Pathology Department.*—The Anatomical Department has clinical facilities for study in the Hospital. Fourth-year students are assigned to various key clinical locations in the Clinical Department.

*The Henry Washington University Clinic.*—This medical

building opened in 1952 houses the Cancer Detection Clinic, the Helen L. and Mary E. Warwick Memorial, and special laboratories for research related to the nature, diagnosis, and treatment of cancer.

The facilities of the Cancer Detection Clinic are available to medical students. In addition, the diagnosis and treatment of various forms of neoplasms are presented. The results of the treatment of neoplasms are evaluated by follow-up studies.

The Helen L. and Mary E. Warwick Memorial, for cancer and allied diseases, was affiliated with The George Washington University in July 1948. The purposes of this clinic are (1) to provide care for cancer patients through group consultation within a cancer organization, and (2) to provide training for students and physicians in the field of oncology.

The District of Columbia General Hospital, Washington's large city hospital, has 1,500 beds and an extensive department in which approximately 50 high patient-care units are made each year. It provides clinical experience in virtually every branch of medicine and surgery.

Clinical anatomy courses clinical training in certain fields at the Walter Reed Army Hospital, one of the Armed Forces' outstanding teaching hospitals. Clinical experience in both medical and surgical subjects is also provided at the Mt. Alto Veterans Administration Hospital.

At Children's Hospital, one of the largest and best known hospitals for children in the United States, medical students receive training and clinical experience in pediatrics, with both clinic and operation patients.

St. Elizabeth's Hospital, which has recently celebrated the twentieth anniversary of its founding, is one of the world's most famous mental hospitals. This hospital cares for 1,500 patients with virtually every known psychiatric and neurologic disorder. The George Washington University medical students begin their studies in psychiatry in their first year and these studies continue throughout the four years. Much of their clinical instruction in psychiatry and neurology is received at St. Elizabeth's, and prominent psychiatrists and neurologists on the St. Elizabeth's staff are members of the George Washington University School of Medicine faculty. Additional clinical experience in psychiatry and neurology is gained by students at the George Washington University Hospital, Psychiatric Department, in the Outpatient Department of the University Hospital, and social history and clinical work in child psychiatry are given in the Psychiatric Department of Children's Hospital.

#### ADMISSION, REGISTRATION, FEE AND FINANCIAL REGULATIONS

Students in the School of Medicine are subject to, and are expected to, cooperate in accordance with the regulations stated on pages 12-15.



Registration in the School of Medicine is for a period of one academic year. After the student has received the minimum of instruction he is obligated for the full course for the academic year. No part of the tuition will be refunded upon withdrawal or dismissal, but any contributions by the School of a student's life dues, etc. are not any way obligated the School to accept the student for any subsequent year, and the right is reserved to drop any student from the School whenever, at the request of the student or the School, the Faculty deems it advisable to do so.

A fee of \$10 is levied the term of completing the course for final examinations for students must accompany such application. This fee applies to students whose professional training was completed at the University as well as to students who have not previously attended this University. This fee must accompany all fees payable to students.

Because the number of applicants far exceeds the limit of each class, during term be received only for those students applicants who submit a deposit of \$100 which will be refunded toward the tuition at the first session. Under no circumstances will this deposit be refunded.

Credit for work without fee given only at the completion of a laboratory course, the student has received he paid for all utilities or equipment or other University property used in his lab, books as discussed. All bookkeeping or fees are directly transferable to an individual student's account and vice versa.

#### COST OF TUITION AND OTHER EXPENSES

The minimum cost of necessary textbooks and student equipment (microscope, drawing materials, glass slides, clinical thermometer, anatomical preparations, etc.) is approximately as follows: first year, \$100; second year, \$100; third year, \$100; fourth year, \$100; total, \$400.

A fee of \$10 a semester is charged for the use (personal) of a locker.

#### RESIDENCY

Students in the School of Medicine are subject to and are expected to conform themselves with the general University regulations issued on every 20th day.

#### ATTENDANCE

Students are to bring every term a pass or check during a school-aid period, showing that the class or clinic has begun, or leaving before class is finished.

Excuses for absence due to illness must be accompanied by a certificate signed by the attending physician and must be filed in the Office of the Dean.



For every successful license a department will deduct one-half of any fee sent from the student's final grade in the subject involved.

#### GRADING

The following grading system is used: *A* (100-110); *B* (80-89); *C* (70-79); *D* (60-74) (includes *E* below 60) follows. *Inc.*, incomplete. The passing grade in each subject is *C*.

A student who is conditionally in one subject will not be advanced until condition is removed and that only by authority of the Committee on Examinations.

#### EXAMINATIONS

Examinations, which may be written, oral, or practical, will be held in the fall of each semester.

All students in the School of Medicine are required to take Part I and Part II of the National Board Examinations, except that students from those states and foreign countries which do not recognize the National Board may be exempted from Part II by action of the Committee on Examinations.

#### PHYSICAL EXAMINATIONS

All first-year students are given a comprehensive physical examination upon admission to the School of Medicine. The students are informed of the findings and advised regarding such measures as will tend to maintain a high standard of health.

In addition medical students benefit from the complete Tuberculosis-Free Finding Program which the School has maintained since 1938. Under this program all students receive tuberculin tests, X-ray examinations, and such special attention from chest specialists as is necessary to reduce to a minimum the dangers from tuberculosis. Students are instructed against these diseases for which proven prophylactic exist.

#### THE DEGREE OF DOCTOR OF MEDICINE

Upon the satisfactory completion of the requirements of the School of Medicine the degree of Doctor of Medicine is conferred.

#### REQUIREMENTS FOR THE DEGREE

Every candidate for graduation with a degree of Doctor of Medicine must be at least twenty-one years of age, of soundable character, and free of all indebtedness to the University. He must have completed the minimum requirements, completed satisfactorily not less than two

entirely apart of study as a matriculated student in Medicine, completing all required courses, and passing satisfactorily all prescribed examinations.

#### CLASSICAL ARTS AND MEDICAL CURRICULUM

It seems to be unnecessary for the degree of Bachelor of Arts, the candidate must complete an hour quarter semester course of prescribed college work for four three semester hours and one year of residence must be completed in Dominican College, the same liberal arts college, and the first year of the medical curriculum. Upon satisfactory completion in the fourth year of the medical curriculum the student becomes eligible for the degree of Doctor of Medicine.

#### HONORS

A candidate who has completed the four-year medical course with an average grade of 80 per cent is recommended for graduation "with distinction."

#### INTERN AND RESIDENT TRAINING PROGRAM

The George Washington University Hospital which training opportunities is classified by the National Board Medical Postgraduate, Inc. Category A, consisting of one year with one additional rotation in the Department of Medicine with emphasis on medicine, one in the Department of Surgery with emphasis on surgery, and two in the Department of Pathology with emphasis on pathology.

*George Washington University*—The University of the District of Columbia, the George Washington University, established in 1898 a first class medical program. It is a member of the American Association of Medical Schools.

#### DEPARTMENT

*Internal Medicine*—Internal Medicine will be assigned to seven months of general medicine, two months in the surgical service, and one month each in obstetrics, gynecology, and pediatrics and geriatrics.

*Internal Medicine*—Internal Medicine will be assigned to the surgical service for one month, to general medicine for two months, and to obstetrics and gynecology for one month.

*Internal Medicine*—Internal Medicine will be assigned to the pathology service for one month, to medicine for two months, to surgery for one month, to pediatrics for one month, and to obstetrics for one month.

#### RESIDENCY

A total of approximately twelve to fifteen approved residencies are offered.

in anesthesiology, cardiac diseases, internal medicine, neurologic surgery, obstetric-gynecology, pathology, physical medicine, psychiatry, rheumatology, surgery and thoracic surgery. Rotatory programs are set from one to four years depending upon the service. Approximately 400 are now subject to rotation. In several of the fields there are affiliations with local and government hospitals.

Following, if one or two years are available to acceptable candidates in anesthesiology, cardiology, chest diseases, infectious diseases, internal medicine, physical medicine, rheumatic diseases, surgery and thoracic surgery.

For application blank and further information, address the Administrator, The George Washington University Hospital, Washington 7, D. C.

#### POSTGRADUATE INSTRUCTION

The School of Medicine offers postgraduate instruction annually, varying according from year to year. The program is designed for physicians in practice.

The College Medical Lectures, inaugurated in 1948 as a series of evening lectures, are presented by distinguished physicians from other cities. These lectures are given presently by alumni faculty, other physicians and members of the senior class of the School of Medicine.

During the academic year 1957-58 approximately 115 physicians were enrolled in postgraduate courses. For further information, address the Director of Postgraduate Instruction, The George Washington University Hospital, Washington 7, D. C.

#### MEDICAL TECHNOLOGIST COURSE

The course for medical technologists consists of twelve consecutive months of didactic and practical work in all phases of clinical laboratory medicine. The course meets the full requirements of the *Engineer of Medical Technology* of the American Society of Clinical Pathologists. Prerequisite: the Junior College Basic Course in Medical Technology, or its equivalent.

Two classes are accepted each year, one entering in September and the other in March. Enrollment in each class is strictly limited so that personal instruction can be given.

Upon satisfactory completion of the course a certificate is awarded and the candidate is eligible for the certifying examination given by the Society of Medical Technologists.

For application blank and further information, address the Director of Laboratories, The George Washington University Hospital, Washington 7, D. C.

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Journal: *Health Affairs*, Vol. 14, No. 1, 1995, Professional Learning in Law

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John Joseph Lynch, A.M., LL.M., *Professorial Lecturer in Law*

<sup>3</sup> The President of the University, the Board of Faculty, and Trust and Academic Deans of the School, the President of the University, the Director of Athletics of the University, the Sports Medical Institute, National Institute, and National Institute of the Faculty.



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The Law School is a part of the University of the State of New York, and is subject to the provisions of the Education Law of the State of New York, and the rules and regulations of the Board of Regents of the University of the State of New York, and the rules and regulations of the Board of Law Officers of the State of New York.

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## GENERAL INFORMATION

## INTRODUCTION

## LOCATION IN THE NATION'S CAPITAL

The George Washington University Law School was, in its first years, the only law school in the District of Columbia. The School took part as a charter member in some of the experiments of the American at American Law Institute and it has been an active member of the American Bar Association. It is approved by the American Bar Association and the American Law Institute.

Washington University, which has had an important place in legal education in the District of Columbia since 1865, was merged into The George Washington University in August 1926.

Of special significance is the location of the Law School in the Nation's Capital, the seat of the law in America, both American and international. The heart of the School goes on in this environment, presenting a unique opportunity for observation and study of the law in its practical, legislative, and administrative. The years of residence at the school give years of participation in the life of the community, which, in the case of the George Washington University Law School, is the government of the United States for law. As a consequence, the work of law school is filled with meaning, whether the work be government or private law school or public law school.

## OBJECTIVES

The primary purpose of the Law School is to prepare men and women to meet the needs of society in the many fields of law, public and private.

These schools will not only be technical skill but also the responsible leadership in the development of the law and the administration of justice. In fulfilling these responsibilities the Law School offers: (1) a program of study in preparation for the practice of law; (2) programs of study and research on the academic level for lawyers as well as for American students; (3) a continuing legal education program for members of the bar; (4) instruction and training on current topics in domestic and foreign law; (5) the publication of a law journal containing the results of research in public law; and (6) encouragement of student professional and scholarly activities.

#### PROCESSES OF STUDY

Traditionally the Law School has been national in the geographic distribution of its students. At the present time, men and women holding baccalaureate degrees from more than three hundred colleges and universities come from the forty-eight states, the territories, and several foreign countries to comprise the student body. As a consequence the programs of study leading to the degrees of Bachelor of Laws and Juris Doctor have been planned to provide instruction and training for the practice of law wherever the Anglo-American legal system obtains.

Classroom work leading to the degrees of Master of Laws and Doctor of Juridical Science is offered for those desiring further study and research in specialized fields of law.

Practical work is made available through the members of the bar who do not desire to register as candidates for degrees. Lawyers may take courses for this purpose either as unclassified graduate students or as continuing legal education students.

Graduate work is offered also to meet the needs of lawyers who come from countries whose legal systems are not based on the English law. There are two programs of study, one leading to the degree of Master of Comparative Law for the lawyers desiring to return to their own countries and the other leading to the degree of Master of Comparative Law (Honorary Thesis) for lawyers planning to remain in this country for the practice of law.

#### ORGANIZATION OF THE CURRICULUM

The curriculum is organized so that students may enter the Law School at the beginning of the fall or spring semester or the academic year, or at the beginning of the summer term.

#### MORNING AND EVENING DIVISIONS

Morning classes, which show Trial Practice Court, meet for ninety-minute periods between 9:00 a.m. and 1:00 p.m. Monday through Friday.

and Property Court meets for a regular period from 9:30 to 11:30 am on Tuesdays.

Evening classes meet for two 45-minute periods from 5:30 to 7:30 pm, Monday through Friday. A two-credit course, e.g., Torts, meets one evening a week; a two-credit course, e.g., Personal Property, meets one evening a week. The evening classes confering of the students of the evening division and law student meeting staff.

#### THE LIBRARY

The Law Library of *university-college* contains the official reports of the *Department of the Journal of* last issue of all the issues prior to the National Executive Council, but at some times complete to them, the National Executive Council, complete; the reports of the United States Supreme Court and lower federal courts; and the reports of federal administrative agencies. Periodically it contains the *United States Reports*, the *English Reports*, the *British Reports*, the *English Law Reports*, the *Times Law Reports*, the *Dominion Law Reports*, the *United States Statutes and Codes*, complete sets of statutes of all the states; the *English statutes*; the principal *English and American decisions* and encyclopedias; collections of serial reports and commercial codes; *United Nations documents*; leading textbooks and treatises; and quarterly complete sets of about 150 legal periodicals. A section of the Library, consisting of books acquired from National University, is known as the *National University Law Collection*.

The international law collection, through the library of the Carnegie Endowment for International Peace, is available to law students.

The Library, which is on the fourth floor of Stockton Hall, is open from 9:30 am to 10:00 pm, Monday through Friday; from 9:30 am to 1:00 pm on Saturdays; and from 12:30 to 1:00 pm on Sundays. Books and other materials do not circulate and must be used in the library.

#### THE LAW REVIEW

The *George Washington Law Review*, published by the University, is edited and managed by students of the Law School under the supervision of Faculty advisors. It is devoted exclusively to state and federal public law. The mission of the University is the National Council, where the primary mission of federal public law may be observed in connection with an unexcelled opportunity for specialization in this field.

The Review organization includes a faculty advisor-in-chief, an assistant faculty advisor, a faculty board of advisory editors, a board of deputy editorial advisory editors, and a board of student editors. The student editors are chosen each year on the basis of scholarship.



## THE STUDENT BAR ASSOCIATION

Good interest in the Law School is a result of the Student Bar Association, which is organized to enable students to become better acquainted with problems of the profession, to foster professional ideals, and to keep abreast of changes incident with members of the profession engaged in every phase of the law.

The work of the Student Bar Association is carried on in various ways without cost to students and without payment of a professional and social license. From time to time lectures are given by outstanding authorities in legal and commercial problems.

An important activity is the New York City Club Competition, which provides an opportunity for training in appellate advocacy. Present and recent past students participate in conferences between various prominent members of the Faculty and the legal bar. Former law students of the Law Club also sit on juries. The final argument is held before a court composed of distinguished federal judges.

## ORDER OF THE GUILD

The Order of the Guild, a national honor society with chapters in over forty law schools, aims "to foster a spirit of careful study and to mark in a fitting manner those who have attained a high grade of scholarship." The George Washington University Chapter was established in 1908. Members are elected each year from the highest ranking ten per cent of the graduating class of the Law School.

## REGULATIONS

*Students in the Law School are subject to, and are expected to familiarize themselves with, the following regulations and the regulations governing Admission, Registration, Fees and Finances stated in Laws 17-24 and the University regulations stated on pages 47-51.*

## AMOUNT OF WORK

Students without substantial outside employment may take a program of studies of fourteen hours a week. Such students may take courses in the evening only if they are not available in the morning and if a majority of the hours taken are in morning courses. Students, whether in the morning or evening divisions, with substantial outside employment must take a limited program of studies not exceeding ten hours a week. Students taking a major must finish their classes in the morning and not take more than ten hours a week. A minimum schedule is set here in the morning division and six hours in the evening division in

important aspect of educational achievement which is reflected by the Honor.

#### ATTENDANCE

Regular attendance at classes is required and is necessary for academic work. A student who is absent or does not attend in any regular way is barred from taking the examination.

#### EXAMINING REQUIREMENTS

Conditions for the Honor of Bachelor at Iowa must require a continuous period of three academic years. Attending to the preceding divisions for the fall and spring semesters constitutes evidence for an academic year; similar attendance in the summer session constitutes the second but discontinuous of our studies (1911). Consequently, a student must meet during his term at least the following requirements: an evening session must attend each. Teachers gathering in each division of less than ten hours in the morning division or less than six hours in the evening division must attend each in a postponed hour. Teachers who attend the summer term must attend additional hours.

Students pursuing a course without actual sessions at other locations and during a term must attend at each school up to the time of the Iowa School must first have the course then work to take required by the Division. In no event will credit be recognized in course or place which might be obtained in a similar period in the school.

#### EXAMINATIONS

Written examinations are held at the end of each course. Every student is required to take the regular examinations unless exempt. No excuse for absence will be granted except by the Dean and then only for illness or other emergency. Application for excuse must be made in writing not later than one month after the date of the examination. A grade of *NC* (No grade) will be entered on the record of a student who excuses, and he may take the next regularly scheduled examination in the course for which the excuse has been granted.

No special examinations will be given; hence, upon written application to the Dean, showing sufficient cause, a candidate for a degree of a course may, before the next regular examination, if he should be excused to take a postponed examination, meet, on the decision of the Faculty, to give a special examination.

If a student fails to take an examination, a grade of *F* (to be entered as *W*) will be recorded unless he has been excused from the examination as provided above or has obtained the Dean's permission to drop the course according to regulations stated on page 42.

## GRADES

Grades are indicated by the letters *A*, excellent, 85-100; *B*, good, 75-84; *C*, satisfactory, 65-74; *D*, poor, 55-64—below standard for graduation; *F*, failed—below 55; and *NG*, no grade—student excused from failure to take regularly scheduled examination. The "Examinations" above the grade name indicate to take an examination. The grades *A*, *B*, *C*, and *D* mean that the work has been completed and credit given for the course. *F*, failed, means that no credit will be given. To obtain credit the student must repeat the course, except that a student who has obtained an average of *C* in the work in the semester just concluded and the preceding semester and received a grade of *F* in only one course during those semesters over, with the consent of the Faculty, take the next regular examination in that course if he has not been excluded previously for non-attendance. If the failure occurs in the first semester, the succeeding semester is used as the second semester. The privilege is limited to taking the next regular examination, except that a candidate for a degree at a university before the next regular examination may be permitted to take a special examination at the end of the next semester. If on the re-examination the student receives a passing grade he will be given credit in the course. Both grades are recorded.

## EXCLUSION AND PROBATION FOR POOR SCHOLARSHIP

*Conditions for the Degree of Bachelor of Laws and Juris Doctor.*

A student who in one semester, or two successive semesters, fails in securing satisfactory grade in more semester hours will be excluded, except that if partially registered he will be permitted to complete the work of the semester. Such a student is not eligible elsewhere as he is excluded in the Law School in its second class. While excluded he may, however, with the consent of the Faculty, be admitted to the next regular examination in those courses in which he has made a grade below passing, and if he receives a grade of passing in those courses with an average sufficient to make his cumulative average not less than *C*, he will be returned.

A student not subject to exclusion under the foregoing rule who at any time fails to maintain a cumulative average of at least *C*, will be placed on probation. A student on probation must at the departmental level show his progress in making his program of study. If a student on probation fails next to the end of the second semester following that in which his average has fallen below *C*, receives grades sufficient to give him a cumulative average of at least *C*, he will be included.

The cumulative average of a student includes all the grades in all the courses taken while he is in the Law School as a candidate for a per-



regular degree. When a student is reported by a recommender to fail in both the first grade and the subsequent grade or grades he is removed to non-matriculate groups.

In special cases in which a student who has been excluded can show improvement that his first grades were due to mental shortcomings beyond his control, and that he has the capacity to pursue the work of law with a definite likelihood of success, such student may be readmitted by the Faculty subject to such conditions as the Faculty may impose.

*Conditions for Graduate Degrees.*—A candidate for one of the graduate degrees whose work is not satisfactory in the opinion of the Faculty, taking into consideration the requirements and standards for the degree, may, by action of the Faculty, be excluded at the end of the semester for which he is currently registered.

*Excluded Student.*—An excluded student whose work is not satisfactory in the opinion of the Faculty may, by action of the Faculty, be readmitted at the end of the semester for which he is currently registered.

#### COMPLETION OF DEGREES

Conditions for the degree of Bachelor of Laws are divided into classes in the completion of semester hours as follows: First year, one through twenty-eight; second year, twenty-nine through fifty-two; third year, fifty-three or more.

### THE DEGREE OF BACHELOR OF LAWS AND JURIS DOCTOR

The program of study leading to the degree of Bachelor of Laws and Juris Doctor was designed to fit the development and maturation of legal personality, skills, and ideas which are commensurate to the requirements of a lawyer for professional responsibility and leadership in public service. This includes, first and foremost, the systematic study of legal education, namely, the study of legal processes—national, provincial, and administrative—and international in the treatment of their law. These programs include the study of the nature and history of law, the history of the Anglo-American legal system, and the history and development of the legal profession; practice in the skills of legal research and legal writing; classroom training in first practice, and, through the method of seminar, conference in great handling of legal problems.

#### REQUIREMENTS FOR THE DEGREE

##### Summer of 1939

To be recommended for the degree of Bachelor of Laws (LL.B.) the student must have completed a residence period of not less than three



academic years (first years for evening students) and eighty semester hours, with a cumulative average of at least C. At least two academic years of residence and twenty-eight semester hours are required of students admitted with advanced standing.

#### First Degree

The degree of *Bach. Juris* (LL.B.) is conferred as a recognition of the completion at the George Washington University Law School, with high rank, of the required program of study for the Bachelor's degree, including experience in research and legal authorship. To be recommended for this degree the student must have completed: (1) a cumulative record of not less than three academic years (first years for evening students); (2) eighty semester hours, with a cumulative average of at least B including one of the following courses: Comparative Law, Jurisprudence or one of the graduate seminars; and (3) one year of acceptable service in the field of student activity of *The George Washington Law School*, service to which is subject to evaluation laid down by the Faculty. All requirements for the degree must be completed in this Law School.

#### Honors

The degree of Bachelor of Laws in *Bach. Juris* "with distinction" will be awarded students who obtain a cumulative average of B.

#### Curriculum

*General and Elective Courses*.—A program of required and elective courses has been developed in order to secure coverage of the basic course as well as to allow a degree of flexibility to meet the diverse interests of students. All first-year courses, three second-year courses, and two third-year courses are required, leaving a total of thirty-eight hours of election. In general, second-year students are restricted to elective courses that do not operate upon the taking of distribution courses will be approved. Similarly, students qualified third-year students may select courses required to take graduate courses and research in a field law.

*Practice and Trial Practice Course*.—Classroom instruction is supplemented by reading and research, oral and written practice, and moots. This instruction includes grounding in the principles of the Federal Rules of Civil Procedure and the Federal Rules of Criminal Procedure. In addition, each second student is required to participate in the work of the Trial Practice Course, which includes the trying of cases on issues raised and on issues raised. A special session of the

must be secured beforehand to the trial of patent cases. Experience in preparing and arguing motions must come as available through the Case Club Organization.

*Patent Law—Students* interested in patent law should take the following group of courses: *United States Patents, International Patent Law, Patent Office Practice, Patent Trial Practice Course, Federal Anti-Trust Law, and Trade Regulation Statutes.*

*Opportunities*—Following is the curriculum for students beginning in the fall semester. Arrangements are made to meet the particular student beginning in the spring semester and the summer.

### Morning Division

#### FIRST YEAR

PAID COURSES	SPRING TERM	UNPAID COURSES	FALL TERM
Chemistry I	4	Science	4
United Method and Latin System	4	Continental Law	4
Personal Statutes	4	Chemistry II	4
Logic	4	General Law and Procedure	4
		Law Library	4
Total	16	Total	16

#### SECOND YEAR

PAID COURSES	SPRING TERM	UNPAID COURSES	FALL TERM
Case Practice	4	Chemistry	4
Statutes	4	Science	4
		Practice	4
Total	16	Total	16

#### THIRD YEAR

PAID COURSES	SPRING TERM	UNPAID COURSES	FALL TERM
Pat. Practice Course	4	Pat. Practice Course	4
Statutes	4	Science	4
Total	16	Total	16

### Evening Division

#### FIRST YEAR

PAID COURSES	SPRING TERM	UNPAID COURSES	FALL TERM
Chemistry I	4	Chemistry II	4
United Method and Latin System	4	General Law and Procedure	4
Personal Statutes	4	Logic	4
Total	16	Total	16

## SECOND YEAR

WALL COURSE	SPRING TERM	WALL COURSE	SPRING TERM
Constitutional Law	4	Constitutional Law	4
Contracts	4	Contracts	4
Property	4	Property	4
Total	12	Total	12

## THIRD YEAR

WALL COURSE	SPRING TERM	WALL COURSE	SPRING TERM
Contracts	4	Contracts	4
Property	4	Property	4
Total	8	Total	8

## FOURTH YEAR

WALL COURSE	SPRING TERM	WALL COURSE	SPRING TERM
Final Practice Exam	4	Final Practice Exam	4
Property	4	Property	4
Total	8	Total	8

## GRADUATE PROGRAM

## DEGREE IN MASTER OF LAWS AND DEGREE OF JURIS DOCTOR

The administration of justice under law is a matter so vast and complex that many graduates find the need for further study in order to become well equipped to meet the demands of the law. Others wish to extend their study into research involving specialized fields. Graduate instruction, leading to the degree of Master of Laws, is designed primarily to enable qualified students to attain one or both of these objectives.

The degree of Doctor of Juris Doctor is offered for students who have shown that it is to extend and further their studies by pursuing original research in law.

Graduate study is available to evening as well as morning students. It is open to students in private practice and to government service who engage in advanced study or original research.

## PROGRAMS IN LEGAL AND FOREIGN LANGUAGES

Two programs of study are provided to meet the needs of lawyers who come from countries whose legal systems are not based on the English

ness. The work lawyers receive will be an aid to an understanding of our system so that they may work intelligently with its materials and procedures when returning to their own countries; there is available the degree of Master of Comparative Law. For foreign lawyers, however, who will not practice in a common law jurisdiction, there is available the degree of Master of Comparative Law (American Program) with an American program of study. With regard to both programs, the students are not engaged in special studies but work in association with the other students in the regular course, each student's program being chosen at his individual wish.

#### STUDYING ABROAD: COMPARATIVE LAW EDUCATION

As a result of changes and expansion in existing fields of the law, more lawyers pursue graduate study in order to keep abreast of current developments. Consequently, an important part of the graduate program is to provide the members of the bar new degrees of learning degree required. The offerings in the field of governmentally regulated private enterprise for specialization. Although traditional and graduate courses are particularly suitable for two-year and four-year courses but for study in association with. Membership of the bar taking graduate work in the law degree is a qualified student or a member of the highest academic standing.

#### RESEARCH IN PUBLIC LAW

Research in public law is conducted under the supervision of members of the faculty. The purpose of the research is to develop new and existing activities in public law, either in government agencies or in private enterprise, individuals or corporations in order to which the government has power, and to assist in the analysis, distribution, formation, and improvement of public law programs and procedures.

Facilities for the graduate degree in the Law School and research facilities are provided for the study of law.

#### EDUCATION AND THE STUDENT

##### MAJOR IN LAW

To be recommended for the degree of Master of Law (LL.M.) the student must have completed a business period of not less than two sessions. Each session should normally be continuous. All requirements for the degree must be completed in the Law School and the student must have completed his year-long preparation for the degree. The student must have completed with a minimum average of 75 percent



semester hours in courses listed in the law curriculum as graduate credit; however, that in appropriate cases third-year courses may be approved for inclusion in the program of study if not previously taken.

#### **Master of Comparative Law**

The degree of Master of Comparative Law (MCompL) is for foreign students who intend to return to their countries. To be recommended for this degree the student must have completed a minimum period of one law class one academic year. He must have completed satisfactorily twenty-four semester hours in approved courses in the curriculum of the Law School or of such other departments of the University as the Faculty of the Law School shall approve.

#### **Master of Comparative Law (American Practice)**

The degree of Master of Comparative Law (American Practice) (MCompL(Am Prac)) is for foreign students who intend to remain in this country. To be recommended for this degree the student must have completed a minimum period of one law class one academic year. He must have completed twenty-eight semester hours in approved courses in the curriculum of the Law School with a cumulative average of at least C.

#### **Degree of Juris Doctor**

To be recommended for the degree of Doctor of Juris Doctor (J.D.) the student must have completed a minimum period of one law class one academic year. He must have earned a course of credit and formally accepted by his committee committee and approved by the Committee on Graduate Studies. At the conclusion of his first year of study he must pass the Examination in Graduate Studies. He may not be admitted even pass an oral examination in these fields of study planned by the committee committee. This examination shall be conducted by the committee committee and will allow members of the Faculty and qualified experts from other research institutions to take part in the examination in Graduate Studies.

Not later than the date specified in the University calendar the candidate must submit to the Dean two typewritten original and two legible and complete carbon copies of his dissertation in its final form. The dissertation must contain a minimum, not to exceed 250,000 words, original text or material. An additional legible typewritten copy of the dissertation must be submitted for publication. To be acceptable the dissertation must be the property of the examining committee, maintain a substantial contribution to the field of law and must be suitable for

publication. Additional information will be supplied by the Chairman of the Committee on Graduate Studies.

The submission of a proposed dissertation will be granted in a volume bearing a number of the University Register. The successful candidate for the degree is required, before receiving his degree, to pay a fee to cover the expense of sending the summary of his dissertation.

## THE SCHOOL OF ENGINEERING

### THE FACULTY AND STAFF OF INSTRUCTION\*

- Martin Alexander Mann, B.S. in Eng., Irig. Dr., *Dean of the School of Engineering*
- Carl Hugo Walker, B.E., M.A.S., *Assistant Dean of the School of Engineering*
- Les Edward Walker, M.S. in M.E., Ph.D., *Director, Engineering Administration Program*
- 
- Richard Norman Olson, Ph.D., C.P.A., *Professor of Business Administration*
- Norman Bruce Ames, M.E., E.E., I.L.B., *Professor of Electrical Engineering*
- James Henry Taylor, Ph.D., *Professor of Mathematics*
- Bernard Cassiano Christensen, B.S. in M.E., *Professor of Mechanical Engineering*
- Thomas Marie Moore, Ph.D., *Professor of Mathematics*
- Charles Randolph Warner, Ph.D., *Professor of Chemistry*
- Carl Hugo Walker, B.E., M.C.E., *Professor of Civil Engineering*
- Martin Alexander Mann, B.S. in Eng., Irig. Dr., *Professor of Civil Engineering*
- Les Edward Walker, M.S. in M.E., Ph.D., *Professor of Engineering Administration*
- Robert Arthur Huchinson, M.S. in C.E., Ph.D., *Professor of Civil Engineering*
- Robert Curtis Vincent, Ph.D., *Professor of Chemistry*
- Glen Darrin Camp, Ph.D., *Professor of Operations Research*
- Frederic Elmer Davis, Ph.D., *Professional Lecturer in Electrical Engineering*
- Walter Edward Smith, E.E. in C.E., M.S. in C.E., *Professional Lecturer in Civil Engineering*
- Robert Irving Schuler, B.S., F.E., *Professional Lecturer in Engineering Administration*
- Frederick Doug Moore, Ph.D., *Professional Lecturer in Engineering Administration*
- Gilbert Chester Jackson, B.S. in C.E., M.B.A., I.L.B., *Professional Lecturer in Engineering Administration*
- Kenneth Frederick McClure, M.S., I.L.B., *Professional Lecturer in Engineering Administration*
- Edith Edward Pullman, B.S. in C.E., M.S. in Eng., D.Eng., *Professional Lecturer in Civil Engineering*
- Charles Benjamin Culshaw, Ph.D., *Professional Lecturer in Engineering Administration*

\*The members of the University are listed in alphabetical order by name and by department. The names of the members of the University are listed in alphabetical order by name and by department. The names of the members of the University are listed in alphabetical order by name and by department.

- Emory C. Clark, Dey, M.B.A., *Professorial Lecturer in Engineering Administration*
- Thomas Philip Emerson, Ph.D., *Professorial Lecturer in Engineering Administration*
- John Samuel, Jr., B.E., Dr. Eng., *Professorial Lecturer in Civil Engineering*
- Frank Alfred Tompkins, LL.M., LL.B., *Professorial Lecturer in Engineering Administration*
- George Maynard Truss, Ph.D., *Professorial Lecturer in Civil Engineering*
- Raymond Paul Truss, C.E., *Associate Professor of Civil Engineering*
- Thomas Hamilton Truss, Ph.D., *Associate Professor of English Composition*
- John Karl, M.S. in M.E., *Associate Professor of Mechanical Engineering*
- Leah Clark, Ph.D., *Associate Professor of Physics*
- Ernest Truss, B.S.E., M.S. in S.E., Ph.D., *Associate Professor of Electrical Engineering*
- Paul Arthur Garton, B.M.E., Ph.D., *Associate Professor of Mechanical Engineering*
- Samuel Philip Tobin, LL.B., M.E., J.D., *Associate Professor in Engineering Administration*
- Alvin Robert Wells, Ed. in Eng., Ph.D., *Associate Professor of Civil Engineering*
- William Lee Davis, B.E., Ed. in C.E., C.E., *Assistant Professor of Civil Engineering*
- Robert Thomas Coleman, Ph.D., *Assistant Professor of Electrical Engineering*
- Paul Martin Smith, B.E., *Assistant Professor of Mechanical Engineering*
- Philip James Morgan, Jr., B.E., M.E. in M.E., *Assistant Professor in Mechanical Engineering*
- George Edward Smith, Lecturer in Electrical Engineering
- Ernest Milton Leonard, B.E. in E.E., *Lecturer in Electrical Engineering*
- William Herbert Leonard, B.E., M.E. in E.E., *Lecturer in Electrical Engineering*
- George Albertson, M.S., *Lecturer in Electrical Engineering*
- William Walter Robinson, B.E.E., M.S. in E.E., *Lecturer in Electrical Engineering*
- Frank Joseph Powell, M.S., *Lecturer in Mechanical Engineering*
- Ralph David Cobb, B.M.E., *Lecturer in Mechanical Engineering*
- James Milton Hamilton, M.S., *Lecturer in Electrical Engineering*
- Robert Douglas, Ed. in E.E., *Lecturer in Electrical Engineering*

\* The additional names are in ascending alphabetical order.



Joseph Lambert Jennings, M.B.P., *Lecturer in Civil Engineering*  
 William Norman Thomas, M.E., *Lecturer in Civil Engineering*  
 Clara Mims Naudy, Ph.D., *Lecturer in Civil Engineering*  
 Robert William Paxon, M.M.E., *Lecturer in Mechanical Engineering*  
 Percy Hume Smith, M.B. in E.E., *Assistant in Electrical Engineering*  
 Alex. Sandham, M.E. in C.E., *Lecturer in Civil Engineering*  
 George Calvin Weaver, M.E., *Lecturer in Mechanical Engineering*  
 Elizabeth Alice Rubin, B.S. in E.E., *Assistant in Electrical Engineering*  
 Lee Shaulow Hays, B.S. in C.E., *Assistant in Mechanical Engineering*  
 Robert Jay Heyman, B.S. in E.E., *Assistant in Electrical Engineering*  
 Michael Paul Struble, B.E., *Assistant in Electrical Engineering*

COMMITTEES\*

The Dean's Council

1968

James Henry Taylor  
 Robert Aaron Hedstrom

1969

Jack Edward Walters  
 Louis Bush

1969

Ernest Frank  
 Paul Arthur Crafton

COMMITTEE ON ACADEMIC AND ACADEMIC FRANCHISE

Raymond Carpenter Crickshanks, *Chairman*

Robert Aaron Hedstrom

Ernest Frank

COMMITTEE ON RESEARCH

The Dean of the School, *Chairman*

James Henry Taylor

Robert Aaron Hedstrom

Carl Hume Walters

Ernest Frank

Raymond Carpenter Crickshanks

COMMITTEE ON GRADUATE STUDIES

Ernest Frank, *Chairman*

Richard Norman Owen

James Henry Taylor

Carl Hume Walters

Jack Edward Walters

Robert Aaron Hedstrom

Gene Darwin Camp

Paul Arthur Crafton

William Walter Balesworth

Kenn Huxton (Living Member)

Richard Wylie (Living Member)

\* The Committee on the University and the School of the School of Engineering are composed of the following members:

## THE ADVISORY COUNCIL

MAJOR VARELY AYIN, Ph.D.

*Director of the National Bureau of Standards*

LYMAN JAMES BROWN, Ph.D., Sc.D., LL.D.

*President of the University*

FRANK LUTHER DUTTON, Ph.D., Sc.D., LL.D.

*Director of Research of the National Bureau of Standards (on leave)*

RALPH LEON GUTENBERG, S.E., Ph.D.

*Engineering Consultant, Milwaukee, Wisconsin Engineering Company*

DAVID CHARLES HALL, S.E.

*Geography, Physics, Chemistry, and History of Chemical Bond and Structure for Professional Engineers*

The Council is made up of faculty of the University who are intimately familiar with the educational needs of the professional and general career served by the School. The Council is advisory to the Trust of the School of Engineering; it carries the function of relating the School to the educational movements of the engineering and scientific career every served by the School.

## GENERAL INFORMATION

## EXTENSION

The School of Engineering was organized in 1886 as the University Extension School. It was then added upon condition with Columbia College as the Department of Practical Science. In 1895 the department was given under an independent organization known as the Washington College of Engineering, and in 1896 the name was changed to the College of Engineering and Machine Arts. During the years became the School of Engineering.

Currently teaching in the degree of Bachelor of Civil Engineering, Bachelor of Mechanical Engineering, and Bachelor of Electrical Engineering, are awarded to the Engineers' Council for Professional Development, the program according to the engineering profession.

## Objectives

The objective of the School of Engineering is to produce graduates who possess knowledge and understanding in the fundamental scientific principles in their fields of study, sound skill in their application, and an attitude of responsible, broad vision and the engineering profession.

#### ADVISORY SYSTEM

Every student entering the School of Engineering as a degree candidate is assigned a permanent faculty adviser, for the purpose of guiding the educational career of the student, providing assistance in his professional development as an engineer, establishing close relations between the faculty and the student, and furnishing counsel and advice in all phases of the academic career of the student.

Faculty advisers counsel students on their programs of study, the achievement and performance of satisfactory scholastic performance, professional development, extra-curricular activity as part of the educational process, and assist the entering student in orientation in the engineering discipline. The adviser represents the student in all cases requiring faculty action.

Students who have not completed 72 semester hours satisfactorily are required to consult their advisers' approval of programs of study prior to registration.

A student who has not completed the course work specified for the bachelor and engineering parts is required to consult his adviser when so directed by the Dean, and to follow the recommendations of his adviser in all academic matters. However, advisers may not direct a student away from any course or activity to which he is entitled under the regulations of the School of Engineering. Students having junior or more status are encouraged to consult their advisers. The Dean acts on temporary advice or request on transfer students pending assignment of their permanent advisers.

All students are encouraged to discuss college problems with their advisers or instructors at any time, and parents or guardians are invited to consult with the Dean and advisers concerning any student problems.

Faculty advisers discharge their counseling duties in accordance with the high principles of their professional responsibility; however, the final responsibility for a student's action lies wholly with the student.

#### REGULATIONS

Students in the School of Engineering are subject to, and are expected to, familiarize themselves with, the regulations concerning ACADEMICS, DISCIPLINARY, STANDARDS AND FINANCIAL stated in parts 1-3-4, and the University regulations stated in parts 4-5-6.

#### AMOUNT OF WORK

Engineers require hours exclusive of the physical education requirements, minimum sound full-time work. Nine semester hours constitute sound part-time work.

A full-time student who is not an engineering man takes ordinarily not more than sixteen semester hours. A student employed more than twenty-four hours a week, who is not an engineering man, may take ordinarily not more than ten semester hours. A student whose graduate index is given by letter may be permitted by the Board to exceed these limits by not more than two semester hours.

A student previously unsuccessful who desires engineering education as represented or at any time during a semester is required to report this fact immediately to the Board, in order that adjustments in schedule may be made. It is necessary, in doing his program within the Faculty's limitations upon the amount of work to be given to an individual student.

#### REGISTRATION

The student is required to attend every meeting of the course in which he is registered, fully prepared to carry on the work required. The student is held responsible for all work in the course, and all absences must be excused before passing will be made for him to make up the work missed. Excuses for absences from examinations which have been postponed in absence are to be secured only by making written application to the instructor in charge of the course.

#### COURSES IN PROGRESS AT DEATH

In addition to the general University regulations on pages 49 to 50, the following regulations apply to students in the School of Engineering:

During the entire time following the first day of classes at a semester, additional courses may be added to the student's program with the approval of the instructor, the student's adviser, and the Board.

During the thirteen days following the first day of classes, courses may be dropped with the approval of the student's adviser and the Board, and without academic penalty. Withdrawal from a course without the approval of the student's adviser results in failure in the course.

Withdrawal from a course, without academic penalty, may be authorized by the Board at any time upon presentation of written evidence of extenuating circumstances.

#### GRADUATE INDEX

The Faculty of the School of Engineering recognizes technical education attainment by an Honor List, consisting of students who, at the time of graduation, the undergraduate degree in engineering, whose education attainment satisfies all of the following requirements:

1. The graduate is cumulative graduate point index is equal to or greater than



3. At least thirty semester hours of credit have been earned while a degree candidate in this School of Engineering.

4. At least fifteen (part-time student), or thirty (full-time student), semester hours of credit in an engineering degree curriculum have been earned in the two semesters immediately preceding the award.

5. No grade lower *E* has been received during the qualifying period mentioned.

6. No disciplinary action has been taken in respect to the student.

The Honor List is prepared at the end of the fall and spring semesters, and displayed in an appropriate public place in the School of Engineering. A notation is made on the student's record each time his name is included in an Honor List.

### THE BACHELOR'S DEGREES

The Bachelor's degrees are Bachelor of Civil Engineering, Bachelor of Electrical Engineering, Bachelor of Mechanical Engineering, and Bachelor of Science in Engineering.

The degree of Bachelor of Science in Engineering may be earned with any of the following options: Engineering Administration, Chemistry, Machine Construction, Mathematics or Physics.

### REQUIREMENTS FOR THE DEGREE

#### Scholarship

The system of grading and increasing scholarship is described in detail chapters 47 and 48.

It is the aim to graduate, a student must have a quality-point index of at least 2.00 in all work taken at The George Washington University, and, in addition, a quality-point index of at least 2.00 in all work required for the degree in the School of Engineering.

**Probation.**—A student must maintain a quality-point index of at least 2.00 or be placed on probation. A student remaining on probation, as long as his quality-point index is below 2.00, or until his probation is removed by the Committee on Scholarship.

Probation is imposed for the amount of time required to complete a minimum of twelve additional semester hours of the curriculum, which may be greater. In certain circumstances the period of probation may be extended. A student on probation may not hold office or participate in the activities of any student organization or represent the School in any undergraduate competition.

Students placed on probation for scholarly delinquency are required to prepare a written statement, once and possibly more as prescribed by the Committee on Scholarship.

**Suspension.**—A student who has a quality-point index equal to or below two will be suspended. A student who becomes eligible to re-enroll for the third time, whether suspended or after an interval, will be dismissed.

A student suspended for poor scholarship may apply for readmission after an interval of one calendar year. He must show scholastic aptitude in the Committee on Admission and Advanced Standing that during his absence from the University he has re-conditioned himself so as to indicate that he will profit by readmission and, in addition, must complete any work remaining from his suspended study as permitted by the Committee. A student suspended twice for poor scholarship will not be readmitted.

The incoming scholarship evaluations are scaled when a student has completed a minimum of twelve semester hours of work. Therefore, the evaluations are scaled at multiples of twelve-semester hours.

#### **ENGLISH COMPOSITION**

Any student whose use of English in any course elsewhere is deemed unsatisfactory may be required by the University to take English 101. The Council may waive this requirement, without academic credit, existing to conform with the needs of the student. If the work completed is equivalent to a course, the required course fee is waived. The granting of a degree may be delayed for failure to make the use made demanded in English in the satisfaction of the Council.

The incoming requirement applies to both written and spoken English.

#### **RESEARCH**

For the Bachelor's degree, a minimum of one year or thirty-six semester hours must be completed in research. Research work may be counted in credits, but it is not more than twenty of graduate equivalent hours from thirty credits. Unless special permission is granted by the Board to pursue work elsewhere, the work of the student on that year must be completed in residence.

#### **UNMATRICULATED RESEARCHERS**

The preliminary conditions of one of the following records is required.

Physical Education is required of all students in the business and education areas. See "Physical Education Requirements", pages 39-40.

Variations from the prescribed records may be made, with the ap-

members of the House's Council.<sup>1</sup> A student desiring to study at a religious shrine and undertake another must make written application to the House concerning satisfactory ground for the submission, and serious interest must be obtained before registration for the course.

A student who is absent from the University for one semester or more (leave or medical) specific [MAY] is required to satisfy the continuing-competency training at the time of his return.

## INDUSTRIAL YEAR FOR ALL ECONOMIC SUBJECTS

Category	Item	Value
•	Category 1	100
•	Category 2	200
•	Category 3	300
•	Category 4	400
•	Category 5	500
•	Category 6	600
•	Category 7	700
•	Category 8	800
•	Category 9	900
•	Category 10	1000
•	Category 11	1100
•	Category 12	1200
•	Category 13	1300
•	Category 14	1400
•	Category 15	1500
•	Category 16	1600
•	Category 17	1700
•	Category 18	1800
•	Category 19	1900
•	Category 20	2000
•	Category 21	2100
•	Category 22	2200
•	Category 23	2300
•	Category 24	2400
•	Category 25	2500
•	Category 26	2600
•	Category 27	2700
•	Category 28	2800
•	Category 29	2900
•	Category 30	3000
•	Category 31	3100
•	Category 32	3200
•	Category 33	3300
•	Category 34	3400
•	Category 35	3500
•	Category 36	3600
•	Category 37	3700
•	Category 38	3800
•	Category 39	3900
•	Category 40	4000
•	Category 41	4100
•	Category 42	4200
•	Category 43	4300
•	Category 44	4400
•	Category 45	4500
•	Category 46	4600
•	Category 47	4700
•	Category 48	4800
•	Category 49	4900
•	Category 50	5000
•	Category 51	5100
•	Category 52	5200
•	Category 53	5300
•	Category 54	5400
•	Category 55	5500
•	Category 56	5600
•	Category 57	5700
•	Category 58	5800
•	Category 59	5900
•	Category 60	6000
•	Category 61	6100
•	Category 62	6200
•	Category 63	6300
•	Category 64	6400
•	Category 65	6500
•	Category 66	6600
•	Category 67	6700
•	Category 68	6800
•	Category 69	6900
•	Category 70	7000
•	Category 71	7100
•	Category 72	7200
•	Category 73	7300
•	Category 74	7400
•	Category 75	7500
•	Category 76	7600
•	Category 77	7700
•	Category 78	7800
•	Category 79	7900
•	Category 80	8000
•	Category 81	8100
•	Category 82	8200
•	Category 83	8300
•	Category 84	8400
•	Category 85	8500
•	Category 86	8600
•	Category 87	8700
•	Category 88	8800
•	Category 89	8900
•	Category 90	9000
•	Category 91	9100
•	Category 92	9200
•	Category 93	9300
•	Category 94	9400
•	Category 95	9500
•	Category 96	9600
•	Category 97	9700
•	Category 98	9800
•	Category 99	9900
•	Category 100	10000

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1. The following information is required for the purpose of the study:

## Bachelor of Civil Engineering

## JUNIOR YEAR

		Hours
CE 101	Advanced Mechanics, Dynamics	3
CE 102	Engineering Materials	3
CE 103	Fluid Mechanics	3
CE 104-105	Structural Theory and Design I and II	6
Math 101	Mathematical Methods for Engineering and Science	3
MS 101	Engineering Fundamentals I	3
ME 101	Heat Transfer	3
Phy 101	Thermodynamics	3
Elective	General education credit	3
Total		27

NOTE: An AAS 1000 military reserve Air-Guard course (CE 101) may be substituted.

## SENIOR YEAR

		Hours
CE 201	Structural Analysis	3
CE 202	Hydraulic Engineering	3
CE 203	Structural Design	3
CE 204	Fluid and Thermal Systems	3
CE 205	Structural Theory and Design III	3
CE 206	Structural Dynamics	3
CE 207	Environmental Engineering	3
CE 208	Advanced and Other Projects	3
CE 209	Construction of Steel I	3
Elective	General education credit	3
Total		27

NOTE: An AAS 1000 military reserve Air-Guard course (CE 201) may be substituted.

## Bachelor of Electrical Engineering

## JUNIOR YEAR

		Hours
EE 101	Advanced Mechanics, Dynamics	3
EE 102	Engineering Materials	3
EE 103	Fluid and Thermal Systems	3
EE 104	Electronics	3
EE 105	Structural Theory and Design	3
EE 106-107	Mathematical Methods for Engineering and Science	6
EE 108-109	Electronics Fundamentals	6
Elective	General education credit	3
Total		27

\*Credit is not given for courses listed in General Education or General Studies.



# The School of Engineering

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EE 118	Advanced Topics: Machinery	4
Math 144	Mathematics for Engineers and Scientists	4
Phys 144	Physics	4
Chem 144	Chemistry	4
English	Approved non-scientific studies	4
Total		16

NOTE—See page 141C for more information. See Section 141.1 for details.

## SENIOR YEAR

EE 118	Final Examinations (including laboratory)	4
EE 144	Communications Laboratory I and II	4
EE 144	Control Systems Analysis	4
EE 144	Control Systems Synthesis	4
EE 144	Electronics Design	4
EE 144	Thermodynamics II	4
EE 144	Advanced Topics	4
EE 144	Chemistry for Electrical Engineering	4
EE 144	Thermodynamics I	4
EE 144	Approved non-scientific studies	4
Total		32

NOTE—See page 141C for more information. See Section 141.1 for details.

## Bachelor of Mechanical Engineering

### JUNIOR YEAR

ME 144	Advanced Mechanics: Dynamics	4
ME 144	Advanced Materials	4
ME 144	Fluid Mechanics	4
Math 144	Mathematics for Engineers and Scientists	4
Phys 144	Physics	4
Chem 144	Chemistry	4
EE 144	Electronics Design	4
EE 144	Thermodynamics I	4
EE 144	Thermodynamics II	4
EE 144	Heat Transfer	4
EE 144	Fluid Mechanics	4
EE 144	Control Systems	4
EE 144	Control Systems	4
EE 144	Approved non-scientific studies	4
Total		32

NOTE—See page 141C for more information. See Section 141.1 for details.

\* These courses may be waived or substituted in Special University or Honors Studies.



The Bachelor of Science in Engineering curriculum provides training in the basic physical principles essential in engineering and in engineering methods of analysis, and in addition, offers an opportunity for study in optional fields in which the student has special interest.

Optional study can be selected from the fields of Engineering Administration, Chemistry, Machine Computer, Mathematics, or Physics. The program of study is the option is formulated by the department concerned in conference with the student. The program, bearing the approval of the Executive Officer of the department concerned, must be submitted by the student to the Dean before the beginning of the junior year.

#### GRADUATE BOARD EXAMINATIONS

During the final semester of the senior year students in the School of Engineering are required to take the following Graduate Board Examinations: the Aptitude Test, which provides a measure of general academic ability at the graduate level; and the Advanced Test (Engineering) designed to measure the achievement of the college senior in his major field of study. (For further information concerning the Graduate Board Examinations, see page 12.)

#### THE MASTER'S DEGREES

The Master's degrees are Master of Science in Engineering and Master of Engineering Administration.

##### THE DEGREE OF MASTER OF SCIENCE IN ENGINEERING

Upon the satisfactory completion of the requirements of the School of Engineering the degree of Master of Science in Engineering is conferred. The discipline of this degree is designed to lead to a comprehension of scientific principles and methods as they are applied in engineering. It is intended that this objective can be served best by providing a scholarship in which the individual needs and desires of the student are as important elements in determining the curriculum. To this end the responsibility for the student's program of study is established by a Committee on Graduate Studies composed of members of the University Faculty and specialists selected from the engineering professions. Programs of study are presented for each candidate by the Committee on Graduate Studies or an assigned advisor, in accordance with his areas of knowledge and needs, and are required to achieve satisfactory understanding of scientific principles and methods. These programs are not restricted to all candidates for the degree. They may include all formal courses, independent study, or self-directed study under assigned faculty, and may include work in several departments and fields of study.

#### ADMISSION TO CANDIDACY

Applications for admission to candidacy for the degree must be submitted to the Office of the Director of Admissions on the form prescribed by that Office. Applicants will be advised by the Committee on Graduate Studies of the time and place of the required personal interview.

Applicants are required to satisfy the Committee of their capacity for graduate study in the discipline and must have completed previous studies. Applicants with Bachelor's degrees from recognized institutions and with transcripts in the names of the Committee on Graduate Studies, and evidence of vigorous preparation for graduate study may be admitted to candidacy for a graduate degree. Applicants who do not hold a satisfactory Bachelor's degree in engineering, or whose evidence of preparation is questioned may be admitted to candidacy upon successful completion of a qualifying examination prescribed by the Committee. Applicants with limited areas of unsatisfactory preparation may be required to complete necessary remedial study before being admitted to candidacy.

#### GRADUATE STUDY

Graduates study completed prior to admission to candidacy for the graduate degree in the School of Engineering will not be transferred to credit but will be considered by the Committee on Graduate Studies in prescribing the candidate's program of study. In addition a minimum of one year full-time study must be completed under the Committee on Graduate Studies.

Course work applied to satisfy requirements for master's degree must not be applied to satisfy requirements for the graduate degree in engineering.

#### EXPERIMENTATION FOR THE DEGREE

The conditions for the degree must include a minimum of one year of full-time study, or the equivalent in part-time study under the guidance of the Committee on Graduate Studies, including the program prescribed by that Committee including course transactions, and demonstration by passing a comprehensive examination, substantial understanding of scientific principles and methods as they are in the area of his interest. The examination may be written, oral, or both, as the discretion of the Committee.

All of the work applied toward this degree must be accomplished under the guidance of the Committee on Graduate Studies.



The candidate must include in his program a research problem approved by the Committee on Graduate Studies. He will be subject to an oral examination on this research.

The candidate's scholarship must be satisfactory to the Committee, and will normally be required to be equivalent to or higher than the grade of undergraduate B. A student whose work is unsatisfactory will be suspended by the Dean, upon the recommendation of the Committee on Graduate Studies or the student's original adviser.

The candidate must complete the requirements for the degree within three years if he is a full-time student; within five years if he is a part-time student.

#### THE DEGREE OF MASTER OF ENGINEERING ADMINISTRATION

Under the satisfactory completion of the requirements of the School of Engineering the degree of Master of Engineering Administration is conferred. The purpose of this program is to offer, through academic study at graduate level, a means of improving the management and administrative ability of government and industrial engineers and scientists.

The objective of this graduate discipline is to develop competence in management principles and practices as they apply to the administration of engineering and scientific activities. Knowledge and understanding are sought rather than breadth of familiarity with techniques.

Study programs are prescribed for each candidate, in accordance with his preparation and objective, by the Committee on Graduate Studies. These programs are not necessarily common to all candidates for the degree. They may consist of formal courses, independent study, or individual study under assigned faculty, and move freely among departments and fields of study. Each candidate is under the personal guidance of a selected faculty member.

#### ADMISSION TO CANDIDACY

Applicants for admission to candidacy for the degree must be submitted to the Office of the Director of Admissions on the form prescribed by that Office. Applicants will be advised by the Committee on Graduate Studies of the time and place of the required personal interview.

Applicants are required to satisfy the Committee of their capacity for productive study in the discipline; must have acceptable personal qualifications; must hold a Bachelor's degree in engineering or science from a recognized institution; must have had some supervisory or administrative experience; and give evidence of preparation, which in the opinion of the Committee on Graduate Studies, is adequate for graduate study.

Applicants who lack a satisfactory Bachelor's degree or whose adequacy of preparation is questioned may be admitted as candidates upon passing qualifying examinations prescribed by the Committee. Applicants lacking satisfactory superiority in administrative experience may, under certain circumstances, be considered by the Committee. Applicants with limited areas of unsatisfactory preparation may be required to complete necessary remedial study before being admitted as candidates.

#### ADVANCED STUDY

Graduate study completed prior to admission as candidates for the degree will not be transferred for credit but will be considered in prescribing the program of study, provided it contributes substantially to the achievement of the objective of the discipline. In any case a minimum of one year full-time study must be completed under the Committee's Graduate Studies.

Study applied to attain the requirements for another degree may not be applied toward the degree of Master of Engineering Administration.

#### REQUIREMENTS FOR THE DEGREE

The candidate for the degree of Master of Engineering Administration must successfully complete a minimum of one year full-time study, or the equivalent in part-time study, as prescribed by the Committee on Graduate Studies, including seven examinations; pass a comprehensive examination in his area of study; and solve a comprehensive problem in engineering administration. At the discretion of the Committee the candidate may be given, and, in fact,

The candidate's scholarship must be satisfactory to the Committee, but will normally be limited to no equivalent to no higher than the grade of undergraduate B. A student whose work is unsatisfactory will be required by the Dean upon the recommendation of the Committee to the effect.

The problem which each candidate is required to solve may be prescribed by the student, but it must be approved by the Committee. In general it is desirable that the candidate's effort to improve his studies in his subject or in a typical administrative problem of a manufacturing concern, trying to solve the problem knowledge of a variety of principles and procedures. The candidate is subject to an oral examination on the problem at the discretion of the Committee.

The work for the degree, including the comprehensive examination, must be completed within three years by a full-time student, or within six years by a part-time student.

#### **THE PROFESSIONAL DEGREE**

The professional degree of Civil Engineer, Electrical Engineer, or Mechanical Engineer may be conferred upon a graduate of the School of Engineering who has demonstrated his professional ability.

#### **REQUIREMENTS FOR THE DEGREE**

1. Application may not be made until three years after graduation and then only if the candidate has had definite responsibility for engineering work of substantial importance.

2. A detailed statement of the candidate's experience, references, the degree sought, and the title of the dissertation must be filed with the Dean eight months before the Commencement at which the degree is to be conferred.

Detailed information concerning the preparation of the dissertation may be obtained from the Office of the Dean.

3. The dissertation will be read for acceptance by an examining committee composed by the Dean of outside members of the Faculty of the School of Engineering and at least one expert from engineering practice. The committee will report its recommendation to the Faculty of the School of Engineering.





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#### GENERAL INFORMATION

##### INTRODUCTION

In 1919 the foundation for the National College of Pharmacy was laid by the Association of Colleges of the District of Columbia. The College was opened in 1921 and continued until 1926, when it became affiliated with The George Washington University.

The School of Pharmacy is accredited by the American Council on Pharmaceutical Education as a class "A" school. It is a member of the American Association of Colleges of Pharmacy.

Washington offers many opportunities for the student of pharmacy. The American Institute of Pharmacy, the headquarters of the American

\* The members of the Council and the lists of the School of Pharmacy are members of the American Association of Colleges of Pharmacy.

Pharmaceutical American is only a few weeks from the School of Pharmacy. The Institute also issues a pharmacological review, a library, and research information. Government agencies and laboratories whose services are most useful to pharmacy, and the government libraries, the facilities of which are open to the student, are readily accessible.

The Institute and the Federal government bring to Washington leaders in the field of pharmacy, many of whom consent to accept students in the School of Pharmacy against governmental admission.

The objectives of the School of Pharmacy are: (1) to train orderly-minded competent pharmacists, particularly but not solely practice, and to help them acquire specialized training in general pharmacy, and an attitude of responsibility in their profession and to society; (2) to promote the useful profession of pharmacy in general, and particularly within the community.

To achieve these objectives, the School has developed a systematic plan of instruction for the professional courses which is integrated with the liberal arts program. It further encourages creative participation in scientific, professional, and civic organizations and activities which increase professional competence, raise professional standards, and help produce social responsibility.

#### REGULATION

*Students in the School of Pharmacy are subject to and are expected to maintain themselves with the employers according to American Employment. They are expected to attend in class 15-20 and the University maintains record on their work.*

Students registered in the Junior College Pharmacy curriculum are subject to the regulations of the Junior College. However, in the professional courses of that curriculum, the attendance requirements of the School of Pharmacy prevail.

#### AMOUNT OF WORK

Special work by any year is that without notice the limit of "Current Law Requirements", below. A student who wishes to take more than the normal amount of work must be in touch with the secretary of the Committee on Registration, the members of which are placed in their decision by the Advisory Council and the Senate to which it is submitted. A student on probation is limited to the number of courses listed for that year.

The student is not encouraged to undertake serious employment while attending a full course of study. A student who maintains a quality score below of 4.0 or higher for all courses and a quality score index of 1.0 or higher for pharmacy courses must be granted permission by the

Does *not* undertake outside employment. The amount of employment permitted is governed by the scholarship received by the student and the number of semester hours for which he is registered.

A student previously unemployed who accepts employment subsequent to registration is at any time during a semester is required to report that fact immediately to the Dean.

#### ATTENDANCE

Except by special permission of the instructor, credit will not be given for any pharmacy course if absence, including both lecture and laboratory, exceed in number for each semester the hours of credit for the semester. If a course has distinct divisions such as lectures, laboratories or seminars, the absences apply pro rata to each division.

#### EXAMINATIONS BEFORE STATE BOARDS OF PHARMACY

To be eligible for examination before state boards of pharmacy, the applicant is required to present satisfactory evidence of graduation from a college of pharmacy. In addition, most states require that the applicant have one year of practical experience in a pharmacy. This experience may not be gained concurrently with the school year.

#### THE DEGREE OF BACHELOR OF SCIENCE IN PHARMACY

Upon the satisfactory completion of the requirements of the School of Pharmacy, the degree of Bachelor of Science in Pharmacy is conferred.

#### REQUIREMENTS FOR THE DEGREE

##### SCHOLARSHIP

The system of grading and of computing scholarship is described in detail on pages 47 and 48.

In order to graduate, a student must have a general quality-point index of at least 2.00. In addition, he must have a quality-point index of at least 2.50 in all pharmacy courses.

**Prerequisites.**—A student must maintain a general (over-all) quality-point index of 2.00 and a pharmacy quality-point index of 2.50 or be placed on probation.

The following scholarship rules on general quality-point index are applied when a student has accumulated a multiple of 2 semester hours. The rules on pharmacy quality-point index are applied when a student has completed 16 pharmacy semester hours and thereafter are applied in multiples of 2 hours.

**First Probation.**—A student is placed on first probation when his general quality-point index at below 2.00 or his pharmacy quality-point index is below 2.00. (See also under Suspension.)

**Second Probation.**—A student who has a general quality-point index below 2.00 or a pharmacy quality-point index below 2.00 given a number of nine semester hours is placed on second probation. However, a student who has a general quality-point index between 2.00 and 2.25 will be considered by the Committee on Scholarship. A student who has a pharmacy quality-point index between 2.00 and 2.25 will be considered by the Committee. In each case, the Committee may extend long or probation or suspend him.

**Suspension.**—A student who has a general quality-point index below 1.75 or a pharmacy quality-point index below 1.75 will be suspended; however, a student who has a general quality-point index between 1.75 and 1.99 will be considered by the Committee on Scholarship. A student who has a pharmacy quality-point index between 2.00 and 2.25 will be considered by the Committee. In each case, the Committee may extend him on probation or suspend him.

A student who is subject to probation for the third time, whether suspension or after an interval, will be suspended. In considering a student for suspension, the various provisions shall apply to either the general or the pharmacy quality-point index with probation for each index independent of the other index.

A student suspended for poor scholarship must apply for readmission after an interval of a calendar year. He must then submit evidence to the Dean of the School of Pharmacy that during his absence from the University he has conducted himself so as to indicate that he will profit by attendance. A student suspended twice for poor scholarship will not be readmitted.

#### CURRICULUM

The Junior College Pharmacy curriculum (see pages 52-58) commences the first two years of the four-year pharmacy course. The curriculum is established by the faculties of the School of Pharmacy and the Junior College in accordance with professional needs, and conforms, in so far as possible, with the latter group regarding the general cultural studies.

The laboratory method of teaching is used. Recitation classes are held in connection with each course in order to provide pharmacy drill in the subjects.

The curriculum requirements include at least 121 semester hours. The following instruction leads to the degree of Bachelor of Science in Pharmacy.



## Freshman and Sophomore Years

Courses	Freshman*	Sophomore*	Sub. hrs.	Credit hrs.*
Courses in the School Catalog (See under 100)	20	20	32	32

## Junior Year: Fall Semester

Courses	Lab. hrs.	Sub. hrs.	Wk. hrs.	Credit hrs.
101	16	48	4	3
102	16	48	4	3
103	16	48	4	3
104	16	48	4	3
105	16	48	4	3
106	16	48	4	3
107	16	48	4	3
108	16	48	4	3
109	16	48	4	3
110	16	48	4	3
111	16	48	4	3
112	16	48	4	3
113	16	48	4	3
114	16	48	4	3
115	16	48	4	3
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125	16	48	4	3
126	16	48	4	3
127	16	48	4	3
128	16	48	4	3
129	16	48	4	3
130	16	48	4	3
131	16	48	4	3
132	16	48	4	3
133	16	48	4	3
134	16	48	4	3
135	16	48	4	3
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## Senior Year—Spring Semester

Subject	2nd yr.	3rd yr.	4th yr.	Total
Chemistry, Gen. ....	41	—	4	45
Chemistry, Adv. ....	41	30	4	75
Physics, Gen. ....	38	36	—	74
Physics, Adv. ....	12	—	2	14
Mathematics, Gen. ....	74	—	4	78
Mathematics, Adv. ....	28	—	1	29
English, Gen. ....	15	—	1	16
English, Adv. ....	—	2	1	3
Total .....	209	68	16	293
Grand Total .....	278	136	141	555

## THE DEGREE OF MASTER OF SCIENCE IN PHARMACY\*

Upon the satisfactory completion of the graduate requirements of the School of Pharmacy, the degree of Master of Science in Pharmacy is conferred.

## DEFINITION OF THE MASTER'S WORK

The study leading to the degree of Master of Science in Pharmacy is a comprehensive survey of one or more of the fields of knowledge embraced by Pharmacy. It is a continuation of the work in the student's master's graduate subject and involves a greater prominence with scholarly method.

The student must satisfy certain minimum requirements as to previous preparation, academic ability to read an approved modern foreign language (European), and various others; but these requirements, while essential, are regarded essentially as qualifying measures. The student's knowledge of his field, as demonstrated by his thesis and by the results in his Master's examination (compare with such other examinations involving special skills or techniques as may be necessary), is the basis upon which the Master's degree is conferred. The foreign language requirements may be waived for thesis areas in the sciences of medicine where full of study in the Master's thesis may not require such preparation.

\* Formerly granted to the graduate work and research the certificate of honor degree in Pharmacy. For use of those students who are entitled to the Pharmacy certificate.

† Formerly included in the thesis list, subject to change.

## REQUIREMENTS FOR THE DEGREE

## RESIDENCE

A student whose residence is required, i.e., completion of a year's work at least, summer hours of study including the thesis which is counted as the equivalent of six summer hours of course work. Summer work may be counted as residence, but it is not that the period of summer sessions has been counted as work. The work must properly represent credit which must be approved in advance by the Dean of the School of Pharmacy and be taken in another school or division of the University, and such work may not be counted toward both a degree in that school or division and the Master's degree in the School of Pharmacy.

## ADVANCE IN WORK

A student whose previous education in his chosen field has been complete may complete his requirements including the thesis, by a minimum of three summer hours which are applied to his additional work. First-grade courses may not be credited toward the Master's degree. Previous master's work may be credited toward the Master's degree only when recognition for graduate credit has been secured at the beginning of the course by the instructor and the Dean of the School of Pharmacy.

## ADMISSION TO CANDIDACY

In addition to admission requirements stated on page 54 the student for admission to candidacy for the Master's degree must be approved by the appropriate representative of the Department of Pharmacy and by the Dean.

## SPECIALTY

A student whose scholarship is considered outstanding may be permitted by the Dean upon recommendation of the staff member under whom the student is working.

## THE MASTER'S THESIS

The thesis may be of a research, expository, critical, or creative type. The main purpose of a Master's thesis is to demonstrate the student's ability to make independent use of the information and training received through his other disciplines, and to furnish abstracting systems or his constructive progress in his chosen field. Registration for the thesis must

be no later than the beginning of the final year in preparation, when the professor in charge of the thesis presents registration at the beginning of the final semester. The choice of the thesis subject must be approved by the professor in charge of the student's field and recorded in the Office of the Registrar by the date announced in the University calendar. Registration for the thesis is voluntarily made on the basis of three semester hours for two semesters' work. In exceptional cases, and with the approval of the professor in charge of the thesis, the student may register for the entire six semester hours during a single semester. The two-semester thesis in the final term must have the approval of the professor in charge of the student's field and must be presented to the Dean by the student not later than the date announced in the University calendar. Requirements regarding the form of the thesis are stated in case to each individual information will be supplied by the Dean.

Payment of tuition for the thesis entitles the candidate, during the academic year of registration, to the advice and direction of the member of the faculty under whom the thesis is to be written. In case a thesis is submitted, no additional semester's position may now be granted without faculty tuition payment. If the preparation of the thesis extends beyond the academic period the student must register for it again and not receive on the same basis as for a repeated course.

#### FINAL EXAMINATIONS

In addition to the course examinations, the candidate must pass a final examination on the thesis and be related thereto. This examination may be either written or oral at the discretion of the Faculty.

If the thesis is submitted more than three years after the course requirements have been completed, a written examination covering the student's complete program of study will also be required.



## THE SCHOOL OF EDUCATION

James Harold Fox, A.M., Ed.D., *Dean of the School of Education*  
 Boston University, Boston, U.S.A.

Walter D. Kistner, Ph.D., Ed.D., *Dean of the School of Education*  
 Wayne State Univ., Detroit, Mich.  
 William J. Kistner, Ph.D., Ed.D., *Assistant Dean of the School of Education*

South, Harry A. (ed.). A.M., *Principles of Physical Education for Women*.  
 Mitchell Press, 1930. 224 pp. \$1.50.

James Harold Froy, A.M., Ed.D., *Professor of Education*,  
Indiana University, 100 N. Walnut St., M. 100

Thomas R. Kucharski, Ph.D., M.D., Professor of Psychiatry

William Henry Myers, A.M., *Professor of Physical Education for Men*

Thomas J. Ryan, A.M., Ed.D., *Professor of Education*

*W. H. R. Rind, A.M., Institute of Physical Education, 10*

Helen K. Adams, A.M., Ed.D., Professor of Education

William Wale Firth, Ph.D., Professor of Social

See Latham, H. C., 1900, 1901, 1902.

John P. Miller, A.M., D.D., *Presidential Lecturer on Education*  
John P. Miller, A.M., D.D., *Director of the University of Chicago*

<sup>1</sup> Frederick C. Brown, B.S., M.P., *Practical Lectures in Toxicology*.

*Robert R. Kover, Ph.D., M.D., Professorial Lecturer in Law*

Miss Lorraine A.M. Ed.D. *Professional Lecturer in Education*

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<sup>24</sup> The Journal of the American Society of Tropical Medicine and Hygiene, the first and foremost journal in the field of tropical medicine, is published by the American Society of Tropical Medicine and Hygiene, 1200 North 17th Street, Arlington, Virginia 22209. American Society of Tropical Medicine and Hygiene, 1200 North 17th Street, Arlington, Virginia 22209.

[illegible]

- William Samuel Barlingh, B.S. in E.E., Ed.D., *Professor Lecturer in Education*
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- Frances Campbell Gordon, F.H., *Lecturer in Education*
- Gerard Ludlow Jones, A.M., F.H., *Lecturer in Education*
- John Carl Long, A.M., Ed.D., *Lecturer in Education*
- Lydia Berne Thompson, B.S., Ed.D., *Lecturer in Education*

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- Ellen Stuart Ladington, Ph.D., *Assistant to Director of U.S. Office of Education*
- Francis James Brown, Ph.D., *Staff Assistant, American Council on Education*

#### Dean Emerita

- Robert Wessinger, A.M., *Director of Field Studies*

Field Service Coordinators

- Alexander Anderson, A.M., Assistant Principal, Washington Lee High School, Arlington, Virginia  
 Mary Foust Mann, A.M., Assistant Principal and Dean of Girls, Washington-James-Byrd High School, Arlington, Virginia  
 Claude Markie Richmond, B.S., A.M., in Ed., Principal, Stratford Junior High School, Arlington, Virginia

COMMITTEES\*

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1948

Helen Boneste Lawrence  
 Kathryn Mildred Towner

1949

Cathie West Fetter  
 Anthony Charles LaBar

1950

Elizabeth Birtner  
 Vincent James DeAngelis

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The Board of the School, Chairman

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Gracie LaMotte Angel

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Vincent James DeAngelis

\* The Committee on the University and the Dean and Faculty, Board of the School of Education.  
 † The Committee on the University and the Dean and Faculty, Board of the School of Education.  
 ‡ The Committee on the University and the Dean and Faculty, Board of the School of Education.

# GENERAL INFORMATION

## INTRODUCTORY

It is the purpose of the School of Education to prepare teachers, supervisors, and administrators for the higher ranges of educational service, and to offer opportunities for teachers or supervisors to extend their education. The School includes the Department of Education, Practical Education, and Home Economics. It offers both graduate and undergraduate work. Other departments of the University provide general education and subject-matter courses needed for a well-balanced program of teacher education.

The schedule of courses is arranged to meet the requirements of both full-time and part-time students. By attending evening, Saturday, and summer classes, teachers in the schools of the metropolitan Washington area and others while commuting from near by points all the requirements for a degree without giving up their positions.

## REGISTRATION

Students in the School of Education are advised to, and are required to, consult the following books, the regulations concerning Admission, Examinations, Fees and Expenses issued on August 15, 1946, and the University Catalogue issued on June 27, 1946.

## ADVICE TO WORK

Students at various previous levels of study undertake a normal program. A student with a undergraduate index of 2.0 or higher, with the permission of the Dean, may elect the lighter or lighter hours. No student may enroll for more than sixteen hours, except by permission of the Committee on Education.

A student with extraordinary achievement in former hours or has a work is permitted to take a normal program of college work.

A student with extraordinary achievement in former hours or has a work is permitted to take a normal program of college work. Such a student with a quality point index of 2.0 or higher may, with special permission of the Dean, enroll for fifteen or sixteen hours.

A student with extraordinary achievement in former hours or has a work is permitted to take a normal program of college work. Such a student with a quality point index of 2.0 or higher may, with special permission of the Dean, enroll for sixteen or eighteen hours.

A student with extraordinary achievement in former hours or has a work is permitted to take a normal program of college work. Such a student with a quality point index of 2.0 or higher may, with special permission of the Dean, enroll for sixteen or eighteen hours.



A student who increases his hours of enrollment subsequent to registration or at any time during a semester is required to report that fact immediately to the Dean so that his program may be brought within the maximum outlined above.

### THE BACHELOR'S DEGREES

Upon the satisfactory completion of the undergraduate requirements of the School of Education, the degree of Bachelor of Arts in Education, Bachelor of Science in Home Economics, or Bachelor of Science in Physical Education is conferred.

The program of work of each student must be approved by a Faculty advisor. Since each student's program of work will be planned by his particular needs, it is important that the student have a clear concept of his major interest in education, and also that he be familiar with the teaching-certification requirements in the faculty of which he expects to teach.

### REQUIREMENTS FOR THE DEGREE

To be recommended for a degree a student must satisfy the minimum residence, scholarly, and curriculum requirements.

#### RESIDENCE

Candidates for the Bachelor's degree must complete satisfactorily at this University a minimum of thirty semester hours, one of which, with the approval of the advisor, may be in the Off-Campus Division of the College of General Studies.

For full details concerning continuous registration, see pages 51-52.

#### SCHOLARSHIP

The system of grading and of computing scholarship is described in detail on pages 41 and 42.

In order to graduate, a student must have a quality-point index of at least 2.00.

**Probation.**—An undergraduate student who fails to maintain a quality-point index of at least 2.00 will be placed on probation. A student remains on probation as long as his quality-point index is below 2.00, or until the probation is removed by the Committee on Scholarship.

**Dismissal.**—An undergraduate student on probation who fails to raise his quality-point index to 2.00 within the time specified by the Committee on Scholarship may be dismissed. An undergraduate student who fails to make passing grades in not less than one of a minimum of 10 semester hours of course work may be dismissed.

A student who has been suspended for poor scholarship and written two days appeal for entry to the Committee on Scholarship through the Dean. If the case appears to be resolvable and the student answers fully to inquiry as to scholarly character, the Committee may readjust him on probation. A student who has been denied readmission on probation may petition the Committee on Scholarship through the Dean for readmission after a lapse of a calendar year. A student who has been suspended twice will not be readmitted.

#### UNIVERSITY REQUIREMENTS

It is one of the following catalogs of four thirty semester hours each which all students must fulfill:

#### Bachelor of Arts in Education

Programs leading to the degree of Bachelor of Arts in Education have four main objectives: (1) possession of general educational background, (2) a functional command of theory, concepts, knowledge, and skills as used in many teaching fields, (3) a mastery of basic professional information and skills adequate for a beginning teacher, and (4) development of personal needed for success in teaching. Since the programs of teaching have little to do with and secondary, most programs are taught first course in terms of academic hours. Most require less than 120 semester hours of satisfactory work, including at least Physical Education.

Normally, forty semester hours of the work requirement are completed in the Junior College of the University or in an equivalent institution elsewhere. (See "Scholarship", page 48.)

The general educational background areas in progressive teacher education programs: (1) prewriting activities, (2) writing courses, (3) work experience, (4) leadership training, (5) participation in student campus activities, and (6) utilization of appropriate cultural experiences.

Teaching-Aid requirements include satisfactory completion of approved graduate courses in one or more fields, a satisfactory score on the special field examination of the National Teaching Examination, and satisfactory completion of the prescribed second academic course. Programs of study are available in the following fields: art, biology, business education, chemistry, elementary education, English, French, geography, German, history, mathematics, science, social studies, health and speech.

Those preparing to teach at secondary level are required to complete the prescribed course in a minor as well as a major field.

# The Journal of Education

## Prescribed Courses in the Various Teaching Fields\*

1917

The following courses are the following years:

- 1-1000 Introduction to the Study of Education
- 1-1001 Educational History and Theory
- 1-1002 Educational Psychology
- 1-1003 Educational Sociology
- 1-1004 Educational Administration
- 1-1005 Educational Research
- 1-1006 Educational Measurement
- 1-1007 Educational Evaluation

The following courses are the following years:

- 2-1001 Educational Psychology
- 2-1002 Educational Sociology
- 2-1003 Educational Administration
- 2-1004 Educational Research
- 2-1005 Educational Measurement
- 2-1006 Educational Evaluation

The following courses are the following years:

- 3-1001 Educational Psychology
- 3-1002 Educational Sociology
- 3-1003 Educational Administration
- 3-1004 Educational Research
- 3-1005 Educational Measurement
- 3-1006 Educational Evaluation
- 3-1007 Educational History and Theory
- 3-1008 Educational Psychology
- 3-1009 Educational Sociology
- 3-1010 Educational Administration
- 3-1011 Educational Research
- 3-1012 Educational Measurement
- 3-1013 Educational Evaluation
- 3-1014 Educational History and Theory
- 3-1015 Educational Psychology
- 3-1016 Educational Sociology
- 3-1017 Educational Administration
- 3-1018 Educational Research
- 3-1019 Educational Measurement
- 3-1020 Educational Evaluation

Total:

1918

- 1-1001 Introduction to the Study of Education
- 1-1002 Educational History and Theory
- 1-1003 Educational Psychology
- 1-1004 Educational Sociology
- 1-1005 Educational Administration
- 1-1006 Educational Research
- 1-1007 Educational Measurement
- 1-1008 Educational Evaluation

1919

- 2-1001 Educational Psychology
- 2-1002 Educational Sociology
- 2-1003 Educational Administration
- 2-1004 Educational Research
- 2-1005 Educational Measurement
- 2-1006 Educational Evaluation





Source: Schinnering, O.: *Handbuch des Deutschen Rechts*.  
Source: Schinnering, O.: *Handbuch des Deutschen Rechts*.

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1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099
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History 940: The Development of European Civilization  
 History 941: The Development of the Civilization of the United States  
 The following books are assigned for the course. Text-book of the following course:  
 History 942: General History of the United States  
 History 943: Representative Americans  
 History 944: Economic History of the United States  
 History 945: The Development of the United States  
 History 946: European History  
 History 947: The Development of the Western World I  
 History 948: The Development of the Western World II  
 History 949: The Middle Ages and Renaissance  
 History 950: Modern History  
 History 951: General History of Europe  
 History 952: European History of Europe  
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1. The first step is to identify the problem or question that needs to be answered. This involves understanding the context and the specific requirements of the task.

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1. The first part of the document is a list of names and their corresponding addresses. The names are listed in the first column, and the addresses are listed in the second column. The names are: John Doe, Jane Smith, and Bob Johnson. The addresses are: 123 Main St, 456 Elm St, and 789 Oak St.

2. The second part of the document is a list of names and their corresponding addresses. The names are listed in the first column, and the addresses are listed in the second column. The names are: John Doe, Jane Smith, and Bob Johnson. The addresses are: 123 Main St, 456 Elm St, and 789 Oak St.

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Professional Education

The basic professional education skills and attitudes needed by beginning teachers are provided through a sequence of courses to be taken in the first and upper years. Lectures and class discussion are closely integrated with field work. Instruction is differentiated to meet the needs of those preparing to teach at the various levels—elementary school, junior high school, senior high school, and adult.

Professional Course—Seminary

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## Professional Courses—Elementary

Education 109-110: Learning and Teaching.....	6
Education 121-22: Society and the School.....	6
Education 111: Methods in Elementary Education.....	6
Education 133-34: Observation and Student Teaching.....	6-9
Total.....	24-27

## Bachelor of Science in Home Economics

The curriculum leading to this degree is designed to prepare young women for the important responsibility of home-making. The program can be adapted, however, to meet special requirements in nutrition, dietetics, clothing, and other related fields. Each student must plan her work with the assistance of a faculty adviser in the Department of Home Economics.

## GENERAL HOME-MAKING

JUNIOR YEAR		SENIOR YEAR	
	Semester Hours		Semester Hours
Home Economics 53.....	3	Home Economics 182.....	3
Home Economics 72.....	3	Home Economics 171.....	3
Home Economics 102.....	3	Home Economics 181.....	3
Home Economics 123.....	3	Home Economics 192.....	3
Physiology 115.....	3	Home Economics 197-98.....	6
Electives.....	15	Electives.....	12
Total.....	30	Total.....	30

## Bachelor of Science in Physical Education for Men

There are three curricula leading to this degree. The Single Major and Subject-Certification Teacher's Curriculum is designed to prepare students for teaching positions in smaller schools where it is necessary to teach an academic subject in addition to physical education. The Single-Major Teacher's Curriculum prepares for the teaching of physical education in the larger schools. The Physical Education and Recreation Curriculum has been planned for those who wish to be prepared to direct programs of recreation in addition to the teaching of physical education.

The minimum requirements for this degree are sixty-six semester hours, distributed as follows:

## SINGLE MAJOR AND SUBJECT-CERTIFICATION TEACHER'S CURRICULUM

The minimum requirements for this degree are twenty-one semester hours in education, twenty-four hours in physical education, eighteen

\* Not required for the minor.

hours in an academic teaching field, and three hours in physiology, distributed as follows:

JUNIOR YEAR	Semester Hours	SENIOR YEAR	Semester Hours
Education 120-121.....	6	Education 131.....	3
Education 122-123.....	6	Education 132-134.....	6
Physical Education 124.....	3	Physical Education 115-116.....	4
Physical Education 125.....	3	Physical Education 122.....	3
Physical Education 127.....	1	Physical Education 131.....	3
Physical Education 113-114.....	4	Physical Education 118.....	3
Physiology 115.....	3	Academic teaching field.....	11
Academic teaching field.....	7		
Total.....	33	Total.....	33

### SINGLE-MAJOR TEACHER'S CURRICULUM

The minimum requirements for this degree are twenty-one semester hours in education, twenty-eight semester hours in physical education, three hours in physiology, and fourteen hours of electives:

JUNIOR YEAR	Semester Hours	SENIOR YEAR	Semester Hours
Education 120-121.....	6	Education 131.....	3
Education 122-123.....	6	Education 132-134.....	6
Physical Education 124.....	3	Physical Education 125.....	3
Physical Education 127.....	1	Physical Education 123.....	3
Physical Education 113-114.....	4	Physical Education 131.....	3
Physical Education 115-116.....	4	Physical Education 118.....	3
Physiology 115.....	3	Electives.....	12
Electives.....	2		
Total.....	33	Total.....	33

### PHYSICAL EDUCATION AND RECREATION CURRICULUM

The minimum requirements for this curriculum are sixty-six semester hours, distributed as follows:

JUNIOR YEAR	Semester Hours	SENIOR YEAR	Semester Hours
Education 120.....	3	Education 131.....	3
Education 121-122.....	6	Education 132-134.....	6
Physical Education 124.....	2	Physical Education 131.....	3
Physical Education 127.....	1	Physical Education 134.....	3
Physical Education 129-130.....	4	Physical Education 131.....	3
Physical Education 113-114.....	4	Physical Education 128.....	3
Physical Education 112.....	1	Physical Education 131.....	3
Physical Education 131-132.....	6	Physical Education 131.....	3
Electives.....	6	Electives.....	6
Total.....	33	Total.....	33



## Bachelor of Science in Physical Education for Women

There are three curricula leading to this degree. The Dual-Major Teacher's Curriculum is designed to prepare students for teaching positions in smaller schools where it is necessary to teach an academic subject in addition to physical education. The Single-Major Teacher's Curriculum prepares for the teaching of physical education in the larger schools. Within this curriculum there is opportunity for specialization in dance, sports, or correctives. The Physical Education and Recreation Curriculum has been planned for those who wish to be prepared to direct programs of recreation in addition to teaching physical education.

The minimum requirements for this degree are sixty-six semester hours distributed as follows:

## DUAL- OR SINGLE-MAJOR TEACHER'S CURRICULUM

The student desiring to prepare herself to teach another subject in addition to Physical Education for Women may do so by choosing her elective hours from one subject-matter field with the advice of the Dean of the School of Education. Relevant work completed in the Junior College may be counted in this subject-matter field.

JUNIOR YEAR	Semester Hours	SENIOR YEAR	Semester Hours
Education 119-121	6	Education 121-22	6
Physical Education 58	2	Education 133-34	6
Physical Education 101	3	Physical Education 111-11	4
Physical Education 105	3	Physical Education 121	3
Physical Education 106	6	Physical Education 112	3
Physical Education 107	1	Physical Education 111	3
Physical Education 111-12	2	Physical Education 118	3
Physical Education 117	1	Elective	5
Physical Education 118	1		
Physical Education 132	1	Total	34
Physical Education 115	3		
Elective	3		
Total	32		

## PHYSICAL EDUCATION AND RECREATION CURRICULUM

JUNIOR YEAR	Semester Hours	SENIOR YEAR	Semester Hours
Physical Education 48	2	Education 121-22	6
Physical Education 58	2	Education 133-34	6
Physical Education 101	3	Physical Education 101	3
Physical Education 105	3	Physical Education 111-11	4
Physical Education 107	1	Physical Education 112	3
Physical Education 109-10	4	Physical Education 121	3
Physical Education 111-12	2	Physical Education 118	3



Physical Education 117.....	1	Physical Education 161.....	3
Physical Education 118.....	1	Physical Education 162.....	3
Physical Education 151-52.....	6		
Physiology 115.....	3	Total.....	32
Electives.....	3		
Total.....	34		

### THE DEGREE OF MASTER OF ARTS IN EDUCATION

Upon the satisfactory completion of the graduate requirements of the School of Education, the degree of Master of Arts in Education is conferred. This is a professional degree, designed to prepare the student for some particular type of educational service. The program of studies leading to the degree is selected by the candidate and his adviser from the various related departments of the University to give the student an adequate background in his chosen vocational field. For the prospective high school or junior high school teacher this will ordinarily include study in the subject which he is planning to teach as well as in the field of education.

In accordance with the foregoing general pattern of work, graduate programs of study are available in the following fields: (1) school administration—secondary school principalship or elementary school principalship; (2) adult education; (3) secondary education—senior or junior high school; (4) elementary education—intermediate grade or early childhood education; (5) curriculum; (6) employee training; (7) guidance; (8) reading. Programs of work for teachers-in-service are differentiated from those for students without teaching experience. Additional information concerning these programs may be obtained by writing to the Dean.

#### ADMISSION TO CANDIDACY

The requirements for admission to candidacy for the Master's degree are stated on pages 20-21. Those desiring to prepare for positions in guidance or administration must have had at least two years of successful teaching experience. Candidates who have had no professional courses must satisfactorily complete the required undergraduate professional courses, including Observation and Student Teaching, in addition to graduate course requirements.

#### ADVANCED STANDING

Graduate work completed in other accredited institutions of learning may be credited toward the Master's degree, but a minimum of thirty semester hours must be completed at The George Washington Uni-

versity as a matriculated candidate for the degree in the School of Education.

Advanced courses completed in excess of the requirements for the Bachelor's degree in this University may be credited toward the Master's degree to the extent of twelve semester hours, provided the work fits in with the student's plan of specialization and is approved in writing by the Dean before being undertaken.

In determining advanced standing at the time of admission or readmission to Master's candidacy at this University, graduate work completed more than three years previously is not counted.

#### REQUIREMENTS FOR THE DEGREE

##### PLANS OF STUDY

Two plans of study lead to the degree of Master of Arts. *Plan 1* requires a minimum of thirty hours of graduate credit, including a thesis carrying six hours of graduate credit. *Plan 2* requires a minimum of thirty-three hours of graduate credit, including the course in *Educational Research Methods and Procedures* carrying three hours of graduate credit.

##### SELECTION OF COURSES

Programs of study under *Plan 1* must include a minimum of twelve semester hours from third group courses in addition to the thesis. Under *Plan 2* a minimum of eighteen semester hours, in addition to the course in *Educational Research Methods and Procedures*, must be from third-group courses.

Programs of study must include a minimum of twelve semester hours selected from courses offered in the Department of Education.

When programs of study include additional academic preparation in one or more teaching fields, undergraduate and graduate courses combined must be at least equivalent to the undergraduate requirements of the Bachelor of Arts degree in the teaching field concerned.

##### RESIDENCE

Candidates for the degree of Master of Arts in Education must complete satisfactorily at this University a minimum of thirty semester hours; nine of which, with the approval of the adviser, may be in the Off-Campus Division of the College of General Studies.

## THE THESIS

The thesis required under *Plan 1*, must conform to standards prescribed. A statement of these standards may be obtained at the Office of the Dean.

The thesis subject must be approved in writing by the candidate's adviser and recorded in the Office of the Registrar by the date announced in the University calendar. One typewritten original and two legible and complete carbon copies of the thesis in its final form (on official thesis paper) must be presented to the Dean by the candidate not later than the date announced in the University calendar. Requirements regarding the form of the thesis are stated on page 32, and additional information will be supplied by the Dean.

Payment of tuition for the thesis will entitle the candidate, during the academic year of registration, to the advice and direction of the member of the Faculty under whom the thesis is to be written. In case a thesis is unfinished, an additional successive academic year may be granted without further tuition payment. If the preparation of the thesis extends beyond the two year period it must be registered for again and tuition paid on the same basis as for a repeated course.

## COMPREHENSIVE EXAMINATION

In addition to the course examinations, the candidate must pass a professional comprehensive examination in two parts: (1) a general examination concerned with an integrated understanding of the major areas in professional education, and (2) a special examination concerned with the candidate's area of specialization.

The general part of the comprehensive examination is divided into three groups as follows: Group I (Foundational) covers learning and teaching, society and the school, child growth and development, adolescent growth and development, history of education, philosophy of education, and educational research. Group II (Major Levels) covers elementary education, secondary education, adult education, employee training, and physical education. Group III (Common Elements) covers administration, curriculum, evaluation, guidance, methodology, and reading.

The candidate must be prepared to answer two questions in each group, none of which shall be concerned with his area of specialization.

## FIVE-YEAR PROGRAM

A candidate entering the School of Education from the Junior College (or with equivalent preparation) may choose a three-year program leading to the degrees of Bachelor of Arts and Master of Arts in Education to be conferred simultaneously. The first year of this combined pro-



gram will be devoted to teaching-field preparation; the work of the second year will include the Bachelor of Arts junior-year professional courses and a maximum of eighteen semester hours of graduate courses; that of the third and final year, senior year undergraduate professional courses and the remaining graduate courses needed for the Master's degree. Observation and Student Teaching to be elected in the third year may not be taken for graduate credit. A quality-point index of at least 2.50 must be attained before beginning the work of the senior year and the program must meet all the requirements for the degrees of Bachelor of Arts and the Master of Arts in Education.

### THE ADVANCED PROFESSIONAL CERTIFICATE

Upon the satisfactory completion of the program of advanced graduate studies of the School of Education, the Advanced Professional Certificate is granted. This program is designed to prepare teachers and administrators for more effective service in their chosen fields and to enable them to qualify for a higher step in the local salary scale.

The program of studies leading to the certificate is selected by the candidate and his adviser from the various related departments of the University in accordance with his needs. In general it includes thirty hours of graduate credit beyond the Master's degree. The candidate wishing to increase his teaching proficiency may include additional study in his teaching field. For information concerning available programs, see the separate catalogue of the School of Education.

### ADMISSION TO CANDIDACY

The requirements for admission to candidacy for the Advanced Professional Certificate are stated on page 21. The applicant who is unable to meet the admission requirements may be admitted with deficiencies to be met by satisfactorily completing prerequisites in addition to the specified program of graduate study. Each applicant must be interviewed by a member of the Faculty of the School of Education. The applicant seeking to qualify for a higher level in the local salary scale must have his program approved by the appropriate representative of the school system employing him.

### TRANSFER OF CREDIT

Appropriate graduate work completed in other accredited higher institutions may be credited toward the requirements for the Certificate, but a minimum of eighteen semester hours must be completed at The George Washington University as a matriculated candidate in the School of



Education. The candidate is encouraged to include in his program study at other accredited higher institutions when such study seems to be in his best interest. In determining advanced standing at the time of admission or readmission to Certificate candidacy, graduate work completed more than three years previously is not counted.

#### REQUIREMENTS FOR THE CERTIFICATE

##### Plans of Study

In planning his program of studies the candidate should give first consideration to his particular needs. If he is a teacher and his graduate study leading to the Master's degree was largely in professional education, he may find it desirable to emphasize additional mastery of his teaching field. If his Master's preparation was in a content field, he may wish to devote a major part of his program to additional professional study. Those in administration and related services may wish to continue specialization on a more advanced level.

The program of study must include, in addition to any prerequisites, a minimum of thirty hours of graduate credit in third-group courses and not less than twelve semester hours in courses offered by the School of Education.

##### RESIDENCE

Candidates for the Advanced Professional Certificate must complete satisfactorily at this University a minimum of eighteen semester hours in courses offered on the campus. The balance of the program may be in the Off-Campus Division of the College of General Studies or in other approved institutions of higher learning. The candidate is not required to pursue his program of study continuously. On request, a leave of absence is granted to the candidate for a period not to exceed three years.

#### THE DEGREE OF DOCTOR OF EDUCATION

The requirements for the degree of Doctor of Education cannot be stated in semester hours, but they consist in general of at least two full years of work beyond the degree of Master of Arts in Education or the equivalent. The programs of study are designed to prepare students for administrative or supervisory positions, the teaching of education in normal schools or colleges, the teaching of an academic subject in schools or colleges, or for specialized types of educational service. The work is given a practical rather than a theoretical bent, and emphasizes the mass-

very and application of subject matter, both in the study requirements and in the dissertation. Special emphasis is placed upon the professional success of the candidate.

The candidate's program of study depends for the most part upon his previous educational background and his professional objective. Opportunities are provided for study leading to the following professional objectives: school superintendent, secondary school principal, elementary school principal, supervisor, director of guidance, director of curriculum development, professor of education, and specialist in educational research.

#### QUALIFICATIONS OF THE APPLICANT

The candidate for the degree of Doctor of Education must have completed (1) graduate work or study prerequisite to his objective, equivalent to that required for the degree of Master of Arts in Education in The George Washington University, and (2) at least three years of successful educational experience.

#### ADMISSION TO CANDIDACY

To be admitted to candidacy for the degree the applicant must be accepted by the Committee on Graduate Studies on the basis of an examination which will usually include the following: (1) a written examination involving problems related to the applicant's background; (2) a scholastic aptitude test; (3) an oral examination.

#### CONSULTATIVE COMMITTEE

If the applicant is accepted as a candidate, his consultative committee in cooperation with the candidate, will (1) determine the fields of study, in each of which the candidate must pass a written examination at least eight months before he presents himself for the degree; (2) formulate a list of course requirements and of readings that will assist him in preparing for these examinations; and (3) designate the tools or investigation that will be needed by the candidate in the prosecution of his study. These tools may include one foreign language or more, statistical methods, historical criticism, or any others considered essential by the committee. An examination in the tools designated must be passed by the candidate before he takes his comprehensive examination.

#### THE DISSERTATION

When the candidate has satisfied the requirements of his consultative committee, the committee is dissolved. A member of the Faculty, in whose field the topic of the dissertation falls, is then appointed to serve

as the candidate's adviser on his dissertation and in his field of specialization, and to recommend him to the Dean for the final oral examination when, in his judgment, the candidate's dissertation is acceptable.

Not later than the date specified in the University calendar the candidate shall submit to the Dean of the School of Education three copies of his dissertation—one typewritten original and two legible and complete carbon copies, on official thesis paper—and also a typewritten summary of the dissertation not to exceed 3,500 words. Requirements regarding the form of the dissertation are stated on page 52, and additional information will be supplied by the Dean.

The successful candidate is required, before receiving his degree, to pay a fee to cover the expense of printing the summary of his dissertation.

#### THE FINAL EXAMINATION

At least three weeks before the degree is to be conferred the candidate must pass an oral examination on his dissertation and on his field of specialization before a committee of the Faculty appointed by the Dean and supplemented by two experts from outside the University. This examination is open to the public and all are privileged to question the candidate. The Dean, or a member of the Faculty designated by him, will preside at this examination.



## THE SCHOOL OF GOVERNMENT

### THE FACULTY AND STAFF OF INSTRUCTION\*

\_\_\_\_\_, *Dean of the School of Government*  
Joe Lee Jessup, M.B.A., *Assistant Dean in the School of Government*

Richard Norman Owens, Ph.D., C.P.A., *Professor of Business Administration*

Elmer Louis Kayser, Ph.D., LL.D., *Professor of European History*

Warren Reed West, Ph.D., *Professor of Political Science*

Harold Griffith Sutton, M.S., *Professor of Finance*

† Mitchell Dreese, Ph.D., *Professor of Educational Psychology*

Ralph Dale Kennedy, Ph.D., *Professor of Accounting*

Wood Gray, Ph.D., *Professor of American History*

Thelma Hunt, Ph.D., M.D., *Professor of Psychology*

Arthur Edward Burns, Ph.D., *Professor of Economics*

John Withrow Brewer, Ph.D., *Professor of International Law*

Harold Loran Geisert, Ph.D., *Professor of Sociology*

Howard Maxwell Merriman, Ph.D., *Professor of American Diplomatic History*

Alan Thomas Deibert, A.M., *Professor of Romance Languages*

Donald Stevenson Watson, Ph.D., *Professor of Economics*

Myron Law Koenig, Ph.D., *Professor of American History*

Arlin Rex Johnson, Ph.D., *Professor of Business Administration*

Everett Herschel Johnson, Ph.D., *Professor of Statistics*

Joe Lee Jessup, M.B.A., *Professor of Business Administration*

Robert Dale Campbell, Ph.D., *Professor of Geography*

Roderic Hollett Davison, Ph.D., *Professor of European History*

Wolfgang Herbert Kraus, Dr. Jur., S.J.D., *Professor of Political Science*

James Carlton Dockeray, Ph.D., *Professor of Finance*

David Springer Brown, Ph.D., *Professor of Public Administration*

Thomas Willard Holland, Ph.D., LL.B., *Visiting Professor of Labor Economics*

Henry Furness Hubbard, Ph.D., *Professorial Lecturer in Psychology*

Gerhard Colm, Dr. rer. pol., *Professorial Lecturer in Economics*

Orton Wells Boyd, A.M., C.P.A., *Professorial Lecturer in Accounting*

Montell Ernest Ogdon, Ph.D., *Professorial Lecturer in Business Administration*

\* The President of the University, the Dean of Faculty, the Dean of the School, the Registrar of the University, the Director of Accounting at the University, Professors, Assistant Professors, Associate Professors, and Assistant Professors constitute the Faculty.  
† 1935-1936, 1937-1938.



- Ralph Aubrey Young, Ph.D., *Professorial Lecturer in Economics*  
 Karl Ernest Stromsem, Ph.D., *Professorial Lecturer in Public Administration*  
 Joseph Leo Krieger, Ph.D., *Professorial Lecturer in Business Administration*  
 Edwin Lewis, M.B.A., *Professorial Lecturer in Accounting*  
 Carl William Clewlow, A.M., *Professorial Lecturer in Business Administration*  
 Eugene Dudley Fields, B.S., C.P.C.U., *Professorial Lecturer in Insurance*  
 Fred Latimer Hadsel, Ph.D., *Professorial Lecturer in Political Science*  
 Clarence McLaughlin, B.S., LL.B., *Professorial Lecturer in Accounting*  
 George Wythe, Ph.D., *Professorial Lecturer in Economics*  
 Frank Higginbotham, M.S., C.P.A., *Professorial Lecturer in Accounting*  
 Forest Carlyle Brimacombe, M.B.A., *Professorial Lecturer in Accounting*  
 Ira Ernest Steele, A.M., *Professorial Lecturer in Accounting*  
 James Leonard Buckler, A.M., *Professorial Lecturer in Accounting*  
 Fernand Vincent Demaret, M.S., *Professorial Lecturer in Accounting*  
 Harold Jerome Bobys, A.B., C.P.A., *Professorial Lecturer in Accounting*  
 William George Torpey, Ph.D., *Professorial Lecturer in Public Administration*  
 Reuben Horchow, M.B.A., LL.B., *Professorial Lecturer in Business Administration*  
 Joseph Novak Stonesiter, A.M., *Professorial Lecturer in Business Administration*  
 Solomon Kullback, Ph.D., *Professorial Lecturer in Statistics*  
 Hans Heyman, M.I.A., *Professorial Lecturer in Economics*  
 Robert Amendt Kinney, A.B., *Lecturer in Political Science*  
 Robert Kave, A.M., *Lecturer in Business Administration*  
 Floyd Millard Riddick, Ph.D., *Lecturer in Political Science*  
 John Provan, M.S., *Lecturer in Public Administration*  
 Milford Kirtland Kellogg, Ph.D., C.P.A., *Professorial Lecturer in Accounting*  
 Edward Campion Acheson, Ph.D., *Associate Professor of Finance*  
 Antonio Alonso, A.M., *Associate Professor of Spanish*  
 Wolfram Karl Legner, Ph.D., *Associate Professor of German*  
 Carr Bartleson Lavell, A.M., *Associate Professor of Sociology*  
 Don Carlos Faith, Ph.D., *Associate Professor of Educational Psychology*  
 James Norman Mosel, A.M., *Associate Professor of Psychology*  
 Rafael Supervia, Doctor en Derecho, *Associate Professor of Spanish*  
 William Columbus Davis, Ph.D., *Associate Professor of Latin American History*

\*Ronald Bettes Thompson, Ph.D., *Associate Professor of European History*

Frederick Charles Kurtz, M.B.A., C.P.A., *Associate Professor of Accounting*

John Whitefield Kendrick, Ph.D., *Associate Professor of Economics*

Richard Catlin Haskett, Ph.D., *Associate Professor of American History*

Wilson Emerson Schmidt, Ph.D., *Associate Professor of Economics*

Joseph Patrick Murphy, A.B., LL.B., LL.M., *Associate Professorial Lecturer on Commercial Law*

William Williams Edwards, A.M., *Associate Professorial Lecturer in Business Administration*

Roy Brandon Eastin, Ph.D., *Associate Professorial Lecturer in Public Administration*

Eric Theodore Hugberg, A.M., *Lecturer in Public Administration*

Irving Samuel Schwartz, A.M., *Associate Professorial Lecturer in Public Administration*

Howard Rowland Ludden, A.M., *Assistant Professor of Political Science*

Helen Zhemchuzhnaya Yakobson, B.S., *Assistant Professor of Russian*

John William Skinner, Ph.D., *Assistant Professor of Economics*

Harland Walter Westermann, A.M., *Assistant Professor of Geography*

Hugh Linus LeBlanc, A.M., *Assistant Professor of Political Science*

Wibur Earle Benson, M.B.A., *Assistant Professor of Accounting*

Chester Hayden McCall, Jr., Ph.D., *Assistant Professor of Statistics*

Alfred Gaylord Obern, Ph.D., *Assistant Professor of Public Administration*

Lewis Miller Nixon, Ph.D., *Lecturer in Public Administration*

William Spencer, A.M., *Lecturer in Political Science*

Frederick Timberlake, M.B.A., *Instructor in Business Administration*

Robert Fenn Towson, Jr., M.B.A., *Instructor in Business Administration*

#### COMMITTEES†

##### THE DEAN'S COUNCIL‡

1958

David Springer Brown

Howard Rowland Ludden

1959

Frederick Charles Kurtz

Frederick Timberlake

1960

James Carlton Dockeray

Ronald Bettes Thompson

\* On sabbatical leave spring semester 1957-58.

† The President of the University and the Dean of the School of Government are members of all of all committees.

‡ Elected by the Faculty.

COMMITTEE ON ADMISSION AND ADVANCED STANDING

John Withrow Brewer, *Chairman*

Howard Maxwell Merriman

David Springer Brown

COMMITTEE ON CURRICULUM AND PROGRAMS

Ralph Dale Kennedy, *Chairman*

John Withrow Brewer

Donald Stevenson Watson

Arlin Rex Johnson

Everett Herschel Johnson

James Carlton Dockeray

David Springer Brown

COMMITTEE ON DOCTORAL STUDIES

Everett Herschel Johnson, *Chairman*

Richard Norman Owens

Ralph Dale Kennedy

Donald Stevenson Watson

James Carlton Dockeray

EXECUTIVE COMMITTEE, BUREAU OF BUSINESS  
AND ECONOMIC RESEARCH

James Carlton Dockeray, *Chairman*

Richard Norman Owens

Ralph Dale Kennedy

Donald Stevenson Watson

Everett Herschel Johnson

GENERAL INFORMATION

INTRODUCTORY

The George Washington University has provided training in both foreign service and governmental theory and administration throughout its history. This was one of its purposes when chartered in 1821. The School of Government was established in 1928 to bring together in various undergraduate and graduate curricula the work offered in foreign service and much of the other academic work in the theory and administration of government.

It is the purpose of the School to give the student an understanding of his responsibilities under the Constitution of the United States in the conduct of public office, domestic and foreign, and to prepare students for careers not only in governmental service but also in related business and professional fields. This can be accomplished not through any single course but through curricula which correlate social, economic, political, historical, business, and psychological studies.

The program embraces both graduate and undergraduate work. Curricula, leading to the degree of Bachelor of Arts in Government are offered in Foreign Affairs, Public Affairs, Accounting, Business Admin-



istration, and Business and Economic Statistics. Graduate work leading to a Master's degree is available in each of these fields and in Economic Policy, Public Administration, Personnel Administration, Counseling, and Psychometrics. Graduate study leading to the degree of Doctor of Business Administration is also available (see pages 198-99).

The Foreign Affairs program is broad, covering international political relations, international trade and finance, international communications, and regional studies. Its purpose is to equip students, by providing general background and specialized work, for careers in the field of American foreign relations. The diplomatic service of the United States, the several agencies of government with responsibilities in the international field, the international organizations, and American enterprise abroad offer opportunities in this field.

The Public Affairs program is a similar broad, composite curriculum covering the appropriate phases of domestic government and policy.

Governmental service requires special training and background in many other areas, including economic research, statistical investigation, accounting, administrative management, and personnel administration. The academic background for such work is offered in the various curricula of the School and is described below.

#### REGULATIONS

*Students in the School of Government are subject to, and are expected to familiarize themselves with, the regulations concerning ADMISSION, REGISTRATION, FEES AND FINANCES stated on pages 13-28, and the University regulations stated on pages 47-54.*

#### AMOUNT OF WORK

A full-time student not on probation may take ordinarily not more than seventeen semester hours. A student employed more than twenty-four hours a week, who is not on probation, may take not more than ten semester hours.

A full-time undergraduate student whose quality point index is 3.50 or higher may take not more than nineteen semester hours. An undergraduate student employed more than twenty-four hours a week, whose quality-point index is 3.50 or higher, may take up to twelve semester hours.

A student previously unemployed who accepts employment subsequent to registration or at any time during a semester is required to report that fact immediately to the Dean in order that adjustments in schedule may be made, if necessary, to bring his program within the Faculty's limitations upon the amount of work to be carried by an employed student.

Exception to these rules will require the approval of the Dean.



## ATTENDANCE

The student is held responsible for all the work of the courses in which he is registered, and all absences must be excused by the instructor in charge before provision is made for him to make up the work missed.

## CLASSIFICATION OF STUDENTS

A student who holds an Associate in Arts degree from the Junior College or the equivalent from another accredited institution, and who has registered his choice of one of the prescribed curricula at the Office of the Registrar, is classed as a *junior*. A student who has completed thirty semester hours in the School of Government is classed as a *sophomore*. A student who has satisfactorily completed the work for a Bachelor's degree and who has registered his choice of one of the prescribed fields of study at the Office of the Registrar, is classed as a *senior in courses*.

## INDEPENDENT STUDY PLAN

Under the independent study plan a student of demonstrated capacity, with special interest in the subject matter of a course, may be permitted to undertake independent study under the personal direction of an instructor, in accordance with the rules of the department of instruction in which the subject falls. Credit under this plan is limited to the specific course credits as designated in the list of courses of instruction in this CATALOGUE.

## THE DEGREE OF BACHELOR OF ARTS IN GOVERNMENT

Upon the satisfactory completion of the undergraduate requirements of the School of Government, the degree of Bachelor of Arts in Government, with a designation of the major field of study, is conferred. The major fields are Foreign Affairs, Public Affairs, Accounting, Business Administration, and Business and Economic Statistics.

Students who have a special need for integrating courses from several departments or from more than one major field may request approval, by a faculty committee, of a special major program. The same rules and regulations will apply as in the regularly offered majors.

## REQUIREMENTS FOR THE DEGREE

## SCHOLARSHIP

The system of grading and of computing scholarship is described in detail on pages 47 and 48.

In order to graduate, a student must have the following: (1) a quality-point index in all of his work of at least 2.00 and (2) a quality-point index of at least 2.50 in his major. The major includes the required courses and courses taken in the group options.

*Probation.*—A student must maintain a quality-point index of at least 2.00, or be placed on probation, where he will remain as long as his quality-point index is below 2.00.

*Suspension.*—A student who has a quality point index below 1.50 or who is placed on probation for a third semester, whether successive or after an interval, will be suspended.

A student suspended for poor scholarship may apply for readmission after an interval of one calendar year. He must then submit evidence to the Committee on Admission and Advanced Standing that during his absence from the University he has so conducted himself as to indicate that he will profit by readmission. A student suspended twice for poor scholarship will not be readmitted.

A student with a limited schedule is affected by the foregoing scholarship rules only when he has undertaken fifteen semester hours.

#### RESIDENCE

For residence requirements, see the University regulations on pages 51 and 52.

#### CURRICULUM REQUIREMENTS

To be recommended by the Faculty for graduation, candidates in the School of Government are required to complete, in addition to the appropriate Junior College work (see curricula on pages 70 and 71), a minimum of sixty semester hours during the junior and senior college years as set forth in one of the following curricula:

##### Foreign Affairs

	Semester Hours
Econ. 181-82... International Economics.....	6
Hist. 15..... European Economic History since 1875.....	3
or Pol. Sc. 171... International Politics.....	3
Hist. 181-82... Diplomatic History of the United States.....	6
Pol. Sc. 172... International Organization: The United Nations.....	3
Pol. Sc. 181-82... International Law.....	6
Pol. Sc. 197... Proseminar in Foreign Affairs.....	3
Foreign Language..... Composition and Conversation.....	6
Geography.....	3

Group Option . . . (To be selected from one of the following groups).....	15
Electives . . . . . (To be selected in consultation with adviser).....	9

Total . . . . . 24

All foreign affairs majors must complete the *required* courses listed above. The group option provides specialization in international politics, international economics, international communication, or a geographic region, depending upon the student's interest. Normally no more than six semester hours may be taken in an option other than the one selected. Consent of the adviser must be obtained for such modification of the option selected.

#### Group I—International Politics

This group option (15 semester hours as noted in list above) is composed of courses in the departments of Political Science, History, and Geography which are related to the study of American diplomatic relations. The selection of courses must be made in consultation with the adviser.

#### Group II—International Economic Relations

The group option (15 semester hours as noted in list above) is composed of courses offered primarily by the departments of Economics and Business and Public Administration which are related to the study of American economic, financial, and business relationships with foreign countries. The selection of courses must be made in consultation with the adviser.

#### Group III—International Communications

This group option (15 semester hours as noted in list above) is composed of courses offered primarily by the departments of Political Science, Psychology, Sociology, and Journalism which are related to the study of international information programs, public opinion, psychological warfare, cultural relations, and public relations. (It is recommended that the student include statistics in his Junior College program.) The selection of courses must be made in consultation with the adviser.

#### Group IV—Area or Regional Studies

The group option (15 semester hours as noted in the list above) may be selected from courses offered in the departments of Economics, History, Political Science, and Geography. Integrated programs of study are available in the following regions or areas: Europe and the Middle East, Asia and the Pacific Area, the Soviet Union, and Latin America. Modifications and combinations of these areas may be made if approved by the adviser, who must also approve the individual courses selected for the option. The foreign language, noted in list above, should be one that is suitable for study of the region or area selected.

### Public Affairs

	Semester Hours
Econ. 121 . . . . . Money and Banking . . . . .	3
Econ. 161-162 . . . . . Public Finance and Taxation . . . . .	6
Econ. 165 . . . . . Government Control of Economic Activities . . . . .	3
Hist. 172 . . . . . Social History of the United States since 1861 . . . . .	3
or Hist. 173 . . . . . Representative Americans . . . . .	
or Hist. 176 . . . . . Political and Constitutional History of the United States since 1861 . . . . .	3
Pol. Sc. 121-122 . . . . . The Constitution of the United States . . . . .	6
Pol. Sc. 145 . . . . . Political Parties and Politics . . . . .	3
Pol. Sc. 151-152 . . . . . Public Administration . . . . .	6



Pol. Sc. 176.... Field Work in Government.....	3
Group Option... (To be selected from one of the following groups).....	15
Electives..... (To be selected in consultation with adviser).....	12
Total.....	60

All public affairs majors must complete the *required courses* listed above. The group option provides specialization in domestic economics or politics. Modifications and substitutions may be made when appropriate or necessary provided the consent of the Adviser is obtained.

#### Group I—Economics Option

	Semester
	Hours
Econ. 111.... Economic Analysis.....	3
Econ. 115.... Business Cycles.....	3
Econ. 141.... Industrial Relations.....	3
Econ. 142.... Labor Economics.....	3
Hist. 174.... Economic History of the United States.....	3
Total.....	15

#### Group II—Politics Option

	Semester
	Hours
Hist. 175-76.... Political and Constitutional History of the United States...	6
Pol. Sc. 111.... Introduction to Comparative Government.....	3
Pol. Sc. 118.... Political Theory	
or Pol. Sc. 120. Foundations of American Democracy.....	3
Pol. Sc. 145.... Political Processes and Public Relations	
or Psych. 156. Psychology of Propaganda and Public Opinion.....	3
Total.....	15

#### Business Administration

	Semester
	Hours
Bus. Adm. 101.... Business Organization and Combination.....	3
Bus. Adm. 102.... Business Management.....	3
Bus. Adm. 105.... Personnel Management in Industry.....	3
Bus. Adm. 131.... Business Finance.....	3
Bus. Adm. 141.... Principles of Marketing.....	3
Bus. Adm. 104-42.... Commercial Law.....	6
Bus. Adm. 148.... Problems in Business Management.....	3
Acct. 103.... Business Bookkeeping.....	3
Comm. 121.... Money and Banking.....	3
Total.....	45
Group Option (to be selected from one of the following groups).....	15
Electives (to be selected in consultation with the adviser).....	15
Total.....	60

All Business Administration majors must complete the *required courses* listed above. The group option shown below provides specialization in several aspects of business. Selection of the option and the courses (15 semester hours) to be taken in it must be made in consultation with the adviser. Normally no more



than 6 semester hours may be taken in no course other than the one selected. Consent of the adviser must be obtained if the student wishes such treatment at his option group.

#### Group I—General Business

This group course is made up of selected courses offered by the departments of Accounting, Business and Public Administration, Economics, and Statistics.

#### Group II—Personal Management

This group course is made up of selected courses offered by the departments of Business and Public Administration, Economics, Psychology, Speech, and Statistics.

#### Group III—Finance

This group course is made up of selected courses offered by the departments of Accounting, Business and Public Administration, Economics, Political Science, and Statistics.

#### Group IV—Marketing

This group course is made up of selected courses offered by the departments of Business and Public Administration, Economics, Geography, and Statistics.

#### Group V—Consumer/Vol.

This group course is made up of selected courses offered by the departments of Accounting, Business and Public Administration, and Economics.

#### Group VI—Insurance

This group course is made up of selected courses offered by the departments of Economics and Business and Public Administration.

#### Group VII—Statistics

This group course is made up of selected courses offered by the Department of Statistics.

*Foreign Commerce*—Business Administration majors who wish to specialize in foreign commerce may request a modification of the above requirements. The modified course includes some of the above named courses and adds others, such as a third year of foreign language, foreign markets, marketing and importing, customs, geography, and other courses relating to commerce trade. Each program must be approved by the adviser.

### Accounting

Acc. 101.....	Cost Accounting .....	3
Acc. 111.....	Financial Statements Accounting .....	3
Acc. 121-22.....	Intermediate Accounting .....	6
Acc. 132.....	Accounting Theory .....	3
Acc. 171.....	Auditing .....	3
Acc. 181.....	Accounting Systems .....	3
Acc. 193.....	Business Budgeting .....	3
Bus. Adm. 122.....	Business Management .....	3
Bus. Adm. 131.....	Business Finance .....	3
Bus. Adm. 164-65.....	Commercial Law .....	3
Bus. 121.....	Money and Banking .....	3
		30
Group Option may be selected from one of the following approved .....		15
Electives (to be selected in consultation with the adviser) .....		15
Total .....		60

All Accounting majors must complete the *required* courses listed above. The group options shown below provide specialization in public accounting, commercial and industrial accounting, and governmental accounting and budgeting. Selection of the option and the courses (15 semester hours) to be taken in it must be made in consultation with the adviser.

#### Group I—Public Accounting

This group option is made up of selected courses offered by the departments of Accounting, Business and Public Administration, and Political Science.

#### Group II—Commercial and Industrial Accounting

This group option is made up of selected courses offered by the departments of Accounting, Business and Public Administration, Economics, and Statistics.

#### Group III—Governmental Accounting and Budgeting

This group option is made up of selected courses offered by the departments of Accounting, Business and Public Administration, Political Science, and Economics.

### Business and Economic Statistics

Stat. 111.....	Business and Economic Statistics I.....	3
Stat. 112.....	Business and Economic Statistics II.....	3
Stat. 117.....	Analysis of Variance I.....	3
Stat. 119.....	Correlation and the Chi-Square Test I.....	3
Stat. 125-27.....	Reading and Research in Business and Economic Statistics.....	3
Bus. Adm. 101.....	Business Organization and Administration.....	3
Bus. Adm. 102.....	Business Management.....	3
Bus. 114-24.....	Economic Analysis.....	3
Bus. 115.....	Business Cycles.....	3
Pol. 121-22.....	Logic and Scientific Method.....	3
Electives (A).....	(To be selected from Statistics).....	3
Electives (B).....	(From Accounting, Business Administration, and Economics in consultation with the adviser).....	15

Total..... 30

### EXAMINATIONS FOR WAIVING CURRICULUM REQUIREMENTS

A student wishing to omit a required course may take such examination as the department prescribes, and, on passing satisfactorily, he may be relieved of the curriculum requirement in that subject and may qualify for registration in an advanced course. Passing of this examination does not entitle the student to any hours of credit toward the degree. A student desiring to take such examinations should make the request of the Dean and pay the required fee.

### GRADUATE RECORD EXAMINATIONS

During the final semester of the senior year students in the School of Government are required to take the following Graduate Record Examinations: the Aptitude Test, which provides a measure of general scholastic ability at the graduate level; and Area Tests (achievement), which

measure breadth of knowledge and understanding in three broad areas of the liberal arts: Natural Science, Social Science, and the Humanities. (For further information concerning the Graduate Record Examinations, see page 52.)

### THE MASTER'S DEGREES

Upon the satisfactory completion of the graduate requirements of the School of Government, one of the following degrees is conferred: (1) Master of Arts in Government with a major in Foreign Affairs, Public Affairs, Economic Policy, Accounting, Business and Economic Statistics, Counseling, or Psychometrics; (2) Master of Arts in Public Administration; (3) Master of Arts in Personnel Administration; (4) Master of Business Administration.

#### ADMISSION TO CANDIDACY

A student is formally recognized as a candidate for the Master's degree only when his application for candidacy has been approved.

A 3.00 average in the undergraduate major is normally required for admission to graduate study.

The candidate for the Master's degree who is deficient in undergraduate preparation may take a comprehensive examination on his undergraduate major field. Passing of this examination entitles the student to admission without taking specific courses to make up his deficiencies.

In courses taken to satisfy undergraduate deficiencies, the student must maintain at least a 3.00 average to be eligible for admission to graduate study.

Candidates for the Master of Arts degree in Foreign Affairs, Public Affairs, or Economic Policy must show a reading knowledge (certified by the appropriate language department) of at least one modern foreign language, to be approved by the Dean. Such examination should be taken before the student begins the second fifteen hours of his work.

#### REQUIREMENTS FOR THE DEGREES

A minimum of thirty semester hours of work, as outlined in the curricula on pages 193-98, must be completed successfully. Variations from these curricula require the permission of the Dean.

No part of the minimum requirements may be taken in any other institution.

A second group course (numbered 101-200) may be counted toward the Master's degree only when registration for advanced credit has been approved at the beginning of the course by the Dean and by the officer



of instruction, and provided that the student has done such extra work in the course as may be prescribed by the instructor.

All work for the Master's degrees must be completed in three years, unless an extension of time is granted by the Dean's Council. Validation examinations may be required.

In addition to the course examinations, the candidate must pass a comprehensive written examination in his major field. These examinations are scheduled two or more times a year (usually in December and in April), and should be taken shortly before or shortly after the completion of the prescribed course work. The candidate must consult with his adviser, well in advance, as to the date of his examination and the definition of the subject matter fields which this examination is to cover. An oral examination on his thesis may also be required.

No work counted toward a Bachelor's degree may be counted toward a Master's degree.

A student who expects to continue his studies for the degree of Doctor of Philosophy (Graduate Council) or Doctor of Business Administration, after receiving the Master's degree, will be assisted in planning his program so that he may qualify for admission to candidacy for the Doctorate.

#### RESIDENCE

No credit is granted for work done in absentia, i.e., without formal instruction, except for the thesis, which may be completed in absentia with the permission of the department or committee concerned.

#### SCHOLARSHIP

Grades for graduate work are "Excellent", "Satisfactory", and "Unsatisfactory"; for further details, see pages 47-48. A minimum of six of the first thirty semester hours of course work completed in the Master's program must be graded "Excellent".

A Master's candidate who has accumulated more than six semester hours of "Unsatisfactory" will be automatically suspended.

#### CURRICULUM REQUIREMENTS

A normal program includes a minimum of twenty-four semester hours of course work and the thesis (six semester hours), to be selected from the courses listed under the chosen major field, and such other courses as may be necessary. Programs should be prepared in advance in consultation with the adviser and submitted to the Dean on the appropriate form; if the program is not completed at the time of registration the must be attended to not later than one month following registration.



### THE THESIS

Students who plan to complete work for a Master's degree in one year should register for the thesis at the beginning of the year; otherwise the thesis should be registered for not later than the beginning of the final year. The choice of the thesis subject must be approved by the professor in charge and recorded in the Office of the Registrar by the date announced in the University calendar. The typewritten thesis in its final form must have the approval of the professor in charge and must be presented to the Dean by the student not later than the date announced in the University calendar. Requirements in regard to the form of the thesis are stated on page 52 and additional information will be supplied by the Dean.

Payment of tuition for the thesis entitles the candidate, during the academic year of registration, to the advice and direction of the member of the Faculty under whom the thesis is to be written. In case a thesis is unfinished, an additional successive academic year is granted without further tuition payment. If the preparation of the thesis extends beyond the two year period, it must be registered for again, and tuition paid on the same basis as for a repeated course.

### MASTER OF ARTS IN GOVERNMENT

This degree is offered in seven different curricula which are described below.

Students who have a special need for integrating courses from two or more of the major fields of concentration for the degree of Master of Arts in Government may request approval, by a faculty committee, of a special major program. All rules and regulations for the degree of Master of Arts in Government will apply to such special programs.

### FOREIGN AFFAIRS

Prerequisite: an undergraduate course in foreign affairs, economic history, or political science, depending upon the field of specialization. Any course equivalent in foreign affairs may be substituted.

The program in Foreign Affairs is offered in four fields of specialization: International Economics, International Politics, International Communications, and Regional Studies.

*International Economics*—Covers courses in economic history and theory in the field of international trade, the balance of payments, international financial policy, and international economic problems, with the principal part of this concentration. One or more courses may be substituted. Other courses may be included with the consent of the advisor.

*International Politics*—Covers courses in political science and history (concentrated over two), in international law, international politics, international cooperation, diplomatic history, and American foreign policy, comprising the principal

requirements for this specialization. Related courses may be added with the consent of the adviser.

*International Communications*—Graduate courses (numbered over 200) in political science, sociology, psychology, and geography with 12 hours (one-half of the course work) in the fields of public opinion, international information, international warfare, and communications, and 12 hours (one-half of the course work) in the fields of international politics and area studies. The adviser in all cases must approve the course selections.

*Regional Studies*—Graduate courses in economics, political science, history, and geography (numbered over 200) dealing with a geographic region, such as Latin America, Europe and the Middle East, Asia, the Soviet Union, or the Pacific Area, comprise the principal requirements. Other courses of broader scope in economics, history, and political science are recommended as part of the program. The adviser in all cases must approve such selections.

The listing of graduate courses for these fields of specialization is given in the departmental offerings for Economics, History, Political Science, Geography, Psychology, and Sociology.

#### PUBLIC AFFAIRS

*Prerequisite:* an undergraduate major in public affairs, economics, history, or political science, depending upon the field of specialization. Any course 440 or over in the Public Affairs Curriculum, as listed on pages 187-88 must be selected.

The program in Public Affairs is offered in two fields of specialization: Domestic Economics and Domestic Politics.

Graduate course required of all students: Political Science 256, The Federal Executive.

Recommended for Domestic Economics: courses in economic development, economic policy, public finance, and national income.

Recommended for Domestic Politics: courses in United States political constitutionality and political history; conservative government; political theory; legislative organization; jurisprudence; political parties; and public opinion.

#### ECONOMIC POLICY

*Prerequisite:* an undergraduate major in economics or the equivalent.

Graduate courses in economics (numbered over 200), Economic Policy. Recommended: courses in income and employment, national income, business cycles, monetary and fiscal policy, economic theory, and statistics. These courses and others that may be appropriate are to be selected with the consent of the adviser.

#### ACCOUNTING

*Prerequisite:* an undergraduate major in accounting or the equivalent. The program in Accounting requires the following courses:

	Accounting Theory
Acct 212..... Managerial Accounting.....	7
Acct 231..... Contemporary Accounting Theory.....	3
Acct 272..... Auditing Practice.....	3
Acct 295-96..... Seminar in Accounting.....	6

The remaining nine hours of course work are to be selected from courses related to accounting with the approval of the adviser.

## BUSINESS AND ECONOMIC STATISTICS

**Prerequisite:** an undergraduate major in business and economic statistics, or the equivalent; such work must include a minimum of 24 semester hours of second-group courses in statistics and a minimum of 18 semester hours in second-group courses in accounting, business administration, and economics.

The Master of Arts program requires at least 12 semester hours of graduate courses in statistics. The remaining 12 semester hours are to be selected from graduate work offered by the departments of Accounting, Business and Public Administration, Economics, and Statistics with the approval of the adviser.

## COUNSELING

**Prerequisite:** an undergraduate major in psychology, business administration, or education; or an undergraduate major in the social sciences appropriate to specialization in this field. The undergraduate background should include necessary basic training in such fields as psychology, sociology, statistics, labor economics, and business management or public administration.

The Master of Arts program in Counseling requires the following courses:

Psychology 120	Seminar: Abnormal Psychology	3
Psychology 125	Seminar: Mental Hygiene	3
Psychology 227	Seminar: Counseling and Guidance	3
Psychology 228	Seminar: Techniques of Counseling	3
Psychology 229	Seminar: Occupational and Educational Interviewing	3
Psychology 230	Seminar: Analysis of the Individual in Problems of Counseling	3

The remaining nine hours are elective, with the approval of the adviser.

## PSYCHOMETRICS

**Prerequisite:** an undergraduate major in psychology, statistics, or the social sciences which includes twelve credits in psychology (general psychology, test and measurements, personality psychology), and related psychology courses; general statistics, mathematics through algebra (preferably through calculus).

The Master of Arts program in Psychometrics requires the following courses:

Psychology 231	Test Construction	3
Psychology 234	Seminar: Test Theory	3
Psychology 240	Seminar: Personnel Measurement Techniques	3
Psychology 209-212	Thesis	6
Statistics 115	Statistics in Psychology and Education	3
Statistics 117	Analysis of Variance I	3
Statistics 118	Correlation and the Chi-square Test I	3

The remaining six hours are elective, with the approval of the adviser.



## MASTER OF ARTS IN PUBLIC ADMINISTRATION

The purpose of the program in Public Administration is to prepare graduates to enter public service in the field of administration and to improve the competence of those already in public employment. The program assumes that effective performance at all levels of administration calls for an understanding of the human factors involved, a knowledge of the nature and institutional characteristics of administration in the public service, and an ability to apply the methods and techniques of management. An understanding of all three elements is provided by bringing together into the program different disciplines, including courses in political science, business administration, psychology, economics, accounting, and statistics.

*Prerequisite:* an undergraduate background in the social sciences, business administration, or, in the absence of such course work, appropriate experience in government service.

The syllabus for the degree must necessarily involve a minimum of 24 hours at the graduate level. This will include 6 hours in theory. Of the remaining 24 semester hours, students must select at least 6 hours from each of the three groups indicated below, and may select courses as are necessary to complete the program. Selection of all courses by the student must have the approval of the adviser.

## GROUP I. HUMAN FACTORS IN ADMINISTRATION

		Semester Hours
Bus. Adm. 288	Executive Leadership	3
Psych. 228	Scientific Techniques of Counseling	3
Pub. Adm. 231	Public Personnel Management	3
Pub. Adm. 232	Personnel Principles and Problems	3
Pub. Adm. 233	Employee Development and Utilization	3
Pub. Adm. 237	Personnel Management and Supervision	3
Pub. Adm. 241	Human Relations in Governmental Administration	3
Pub. Adm. 272	Reading and Conference Course in Public Personnel Administration	3

## GROUP II. METHODS AND TOOLS OF MANAGEMENT

		Semester Hours
Acct. 141	Governmental Accounting	3
Acct. 242	Governmental Accounting and Budgeting	3
Bus. Adm. 109	Office Management	3
Bus. Adm. 208	Management Engineering	3
Psych. 255	Scientific Techniques of Opinion and Attitude Measurement	3
Pub. Adm. 215	Comparative Administrative Systems	3
Pub. Adm. 216	Administrative Analysis and Research	3



Pub. Adm. 217.....	New Tools of Management.....	3
Pub. Adm. 221-22.....	Staff Functions in Government.....	3
Pub. Adm. 254.....	Controlled in the Federal Service.....	3
Pub. Adm. 459.....	Government Procurement and Property Man- agement.....	3
Stat. 149.....	Managerial Statistics.....	3

### GROUP III. PROGRAM MANAGEMENT AND POLICY DIRECTION

Bus. Adm. 142.....	Business Management.....	3
Bus. Adm. 287.....	Management in the Armed Forces.....	3
Econ. 201-2.....	Public Finance and Fiscal Policy.....	3
Econ. 203.....	Problems of Governmental Economic Policy.....	3
Pol. Sc. 101-2.....	Administrative Law.....	3
Pub. Adm. 210.....	The Management Function.....	3
Pub. Adm. 211.....	Problems of Governmental Organization.....	3
Pub. Adm. 212.....	Case Studies in Administration.....	3
Pub. Adm. 214-215.....	Internship in the Administrative Process.....	3
Pub. Adm. 251.....	Governmental Budgeting.....	3
Pub. Adm. 252.....	Planning and Administration of the Army Pro- gram.....	3
Pub. Adm. 260.....	Policy Formulation and Administration.....	3
Pub. Adm. 261.....	Public Opinion and the Administrator.....	3
Pub. Adm. 262.....	Contemporary Administrative History and Practice.....	3
Pub. Adm. 271.....	Reading and Conference Group in Public Management and Administration.....	3

### MASTER OF ARTS IN PERSONNEL ADMINISTRATION

The purpose of the program for the degree of Master of Arts in Personnel Administration is to train graduates in personnel management techniques and problems. While the emphasis is placed on governmental personnel work, the curriculum may be adapted to the interest of graduates who plan a career in personnel relations in business.

Prerequisite: an undergraduate background in the social sciences or, in the absence of such course work, admission to graduate work. Students whose prerequisites will be required.

In addition to the above, the program requires 24 graduate credits. In general, students follow the following work schedule:

Bus. Adm. 241-242.....	Seminar in Business Management.....	3
Econ. 241.....	Labor Economics.....	3
Econ. 244.....	Collective Bargaining.....	3
Pub. Adm. 247.....	Seminar: Government and Industry.....	3
Pub. Adm. 244.....	Seminar: Job Analysis and Evaluation.....	3
Pub. Adm. 245.....	Seminar: Personnel Management and Methods.....	3
Pub. Adm. 246.....	Seminar: Personnel Management Techniques.....	3
Pub. Adm. 271.....	The Management Process.....	3
Pub. Adm. 251.....	Public Personnel Management.....	3

Pub. Adm. 232.....	Personnel Procedures and Problems.....	3
Pub. Adm. 233.....	Employee Development and Utilization.....	3
Pub. Adm. 241.....	Human Relations in Governmental Administration.....	3
Pub. Adm. 272.....	Reading and Conference Course in Public Personnel Administration.....	3

### MASTER OF BUSINESS ADMINISTRATION

This curriculum provides the graduate student with the general and specialized training which will help him advance to responsible positions in business. The program is also valuable for many positions in government, particularly those in "business-type" operations.

The Master of Business Administration program is sufficiently flexible to meet the basic requirements of any vocational objective requiring a knowledge of management principles. While most students in this program will normally take Business Administration 201, Advanced Management, and Business Administration 201-92, Seminar in Management, and other courses in Business Administration, the individual program should be planned with an adviser so as to include graduate courses offered by other departments wherever appropriate. Particular attention should be given the offerings under Public Administration, Economics, Accounting, Statistics, and Psychology.

The degree of Master of Business Administration is granted upon successful completion of 24 hours of course work and 6 hours of *Thesis*. An individual program should be planned in consultation with an adviser.

The thesis area as well as the thesis subject should be selected as early as possible so as to permit effective integration with the course work. Students who do not present a satisfactory undergraduate major will be required to take prerequisite courses, which will be selected in accordance with individual qualification and work experience.

### DOCTOR OF BUSINESS ADMINISTRATION

The work for this degree is under the supervision of the Committee on Doctoral Studies of the School of Government.

An applicant must have the degree of Master of Business Administration, Master of Arts in Business Administration, or Master of Arts in a related field, or the equivalent of such degrees, together with acceptable personal qualities and a capacity for creative scholarship. Each applicant must demonstrate his competence in Statistics and Accounting, either by qualifying examinations or acceptable university credits in these subjects. He must satisfy this requirement in at least one of the two subjects before his application to study for the degree of Doctor of Business Administration will be considered.

After admitting an applicant, the Committee on Doctoral Studies, in consultation with the applicant, will designate six fields of study and appoint an adviser to guide the student in his work in these fields. As part of this work, the student must complete a minimum of thirty semester hours in graduate courses. Additional course work may be prescribed by the adviser.

When the applicant has satisfied his adviser and the Committee of his readiness to take the General Examination, this Examination will be scheduled.

The General Examination is a written comprehensive on fields of study not limited to the subject matter of courses taken in these fields. Two fields of study are required of all applicants: Economic Theory and Business and Economic History. The four additional fields, selected by the Committee and the applicant, will be drawn from the following list: Marketing, Organization and Management, Business Finance and Investments, Personnel Management, Public Administration, Accounting Theory, Money and Banking, Statistics, Risk and Risk Bearing, Transportation and Traffic Management, and such others as the Committee may designate.

Upon successful completion of the General Examination and approval of the subject of the doctoral dissertation, the student may be admitted to candidacy by the Committee on Doctoral Studies. The candidate's research and the preparation of his dissertation are supervised by a Research Adviser designated by the Committee.

The Final Examination of the candidate consists of his oral defense of the dissertation. The examination will be given by a committee appointed by the Committee on Doctoral Studies. Upon successful completion of this oral examination the candidate will be approved for the degree of Doctor of Business Administration by the Committee on Doctoral Studies.

#### SPECIAL PROGRAMS

The Government Management Intern Scholarship Program offers annually fifty scholarships to assist federal agencies in training carefully selected young men and women for administrative leadership in government career service. Each scholarship provides a tuition free course of three hours a semester and appropriate academic credit (up to six semester hours) for the successful completion of training assignments required in any agency which has been evaluated by the University.

The Navy Graduate Comptrollership Program, sponsored by the Naval Post Graduate School, provides 30 semester hours of work in comptrollership and related fields for a selected group of Naval and Marine officers. The Master's degree is awarded upon successful completion of this full-year program.



In cooperation with the College of General Studies, the School of Government conducts the Air Force Resources Management Training Program, under the sponsorship of the Department of the Air Force.

The Air Force Advanced Management Program, sponsored by the United States Air Force Institute of Technology, provides 50 semester hours of work in advanced management and supporting fields for a selected group of Air Force officers. Most of the officers receive the Master's degree upon successful completion of this full-year program.

The School of Government cooperates with the College of General Studies in the off Campus program of that College, particularly in the fields of controllership, governmental administration, and personnel administration.

The Department of Business and Public Administration offers work in the field of property and casualty insurance as part of the educational program of the American Institute for Property and Liability Underwriters, Inc.

#### BUREAU OF BUSINESS AND ECONOMIC RESEARCH

The Bureau, as part of the School of Government, was established to conduct research in both the fields of business and economics. This work is under the direction of the Executive Committee of the Bureau of Business and Economic Research. Special attention is given to problems of the metropolitan area of Washington, D. C. Research projects are also sponsored by public and private agencies. Both faculty and students of the School of Government participate in the activities of the Bureau of Business and Economic Research. Results of research activities as well as abstracts of selected Masters' theses are reproduced and disseminated by the Bureau.



## THE COLLEGE OF GENERAL STUDIES

\* Mitchell Dreesse, Ph.D., *Dean of the College of General Studies*  
Grover LaMarr Angel, Ed.D., *Assistant Dean of the College of General Studies; Director of the Off-Campus Division*  
Howard Belding Gill, M.B.A., *Director of the Institute of Correctional Administration*

### THE DEAN'S COUNCIL†

Benjamin Douglass Van Evera  
Arlin Rex Johnson  
Blake Smith Root

Carl Hugo Walther  
Robert Dale Campbell  
Philip Henry Hightill, Jr.

## GENERAL INFORMATION

### INTRODUCTORY

The objectives of the College of General Studies may be stated briefly as follows: to extend the adult education facilities of the University; to introduce experimental procedures in conducting programs of study for mature students; and to provide auxiliary educational services other than formal programs of study for the community.

To carry out these objectives the College of General Studies, with offices located at 706 Twentieth Street NW., is organized to include the following divisions: the Off-Campus Division; the Campus Division; and the Division of Community Services.

### OFF CAMPUS DIVISION

In recent years, employee in-service training has been increasingly emphasized in government, education, business, and industry. Service personnel in nearby military and naval installations have likewise been increasingly interested in off-duty education as a means of working toward academic degrees and increased professional proficiency. The Off-Campus Division of the College of General Studies works closely with personnel administrators, training officers, school officials, and others interested in developing programs of in-service training and brings the educational resources of the University to bear on such programs. Credit and non-credit courses are organized in any field in which there is sufficient demand and for which instructional facilities can be made avail-

\* On leave of absence fall semester, 1957-58.

† For members of the University, the Dean of the College, the Dean and the Assistant Dean of the College are members ex officio of the Council.

able. These courses meet at the time and place most convenient for the students enrolled and may begin at any time of the year. Credit courses are accepted by any school or college of the University provided (1) the student is accepted for degree candidacy in that school or college; (2) the courses in question are within the scope of the curriculum requirements; and (3) the maximum number of semester hours which can be taken in any school or college of the University, other than that in which the student is a degree candidate, is not exceeded. Credit courses may also be transferred to other colleges and universities.

#### Admission to Course Work

Admission to an off campus course does not constitute admission to degree candidacy or a campus division of the University.

A simplified procedure for admission and registration in off campus courses is conducted at or prior to the first meeting of the class. Transcripts of previous academic work are not required. Registration in credit courses is restricted to those whose qualifications indicate that they are able to complete the course successfully. In general, off campus non-credit courses are open to any individual interested in enrolling. However, when a course is organized at the request of some particular agency or group, admission may be restricted to the students recommended by the sponsoring organization. A limit on the size of classes may have to be imposed in order to maintain the quality of instruction.

#### Admission to Degree Candidacy

In agencies and service installations where there is sufficient enrollment to permit offering the necessary range of courses, it is possible to earn the Associate in Arts, Bachelor of Arts, or Master of Arts degrees without campus studies. For further information, see the bulletin of the College of General Studies.

#### CAMPUS DIVISION

This Division has been established in recognition of the fact that there are adults, well qualified to undertake a particular program of college work, whose academic preparation would not ordinarily qualify them for admission to a previously established school or college of the University, without considerable prerequisite work. It is also recognized that an adult, through his work experience, may have gained competency in some particular area of learning. This knowledge may be validated by special examinations to entitle him to advanced standing toward a degree. For further information, see the bulletin of the College of General Studies.

#### DIVISION OF COMMUNITY SERVICES

This Division was organized to provide needed auxiliary educational services and to promote programs designed to supplement the normal educational offerings of the University.

Non-credit courses in a wide variety of subject fields will be set up at the request of any interested group. There will be no entrance requirements. The length of each course will be determined by the wishes of the sponsoring group and the nature of the subject to be studied.

The George Washington University Reading Clinic offers both diagnostic and corrective work for small groups or individuals and reading improvement techniques for small classes. All courses are designed to meet particular individual needs whether on a remedial basis or for accelerated reading comprehension. (See page 217.)

#### FEES

The tuition fee for off-campus credit courses is \$12 a semester hour. The fees for non-credit courses and eight-week credit courses are payable in full at the first meeting of the course. By special arrangement in fifteen-week credit courses, payments may be made in three equal installments.



## THE DIVISION OF UNIVERSITY STUDENTS

Elmer Louis Kayser, Ph.D., LL.D., *Dean of the Division of University Students*

John Gage Allee, Jr., Ph.D., *Assistant Dean of the Division of University Students*

### THE DEAN'S COUNCIL.\*

Ralph Dale Kennedy

Francis Edgar Johnston

Ira Bowers Hansen

## GENERAL INFORMATION

### INTRODUCTORY

The Division of University Students was established in 1930. In this Division are registered mature students who wish to undertake University courses for credit either here or elsewhere or as auditors, but who are not at this time working toward degrees in this University.

### REGULATION

*Students in the Division of University Students are subject to, and are expected to familiarize themselves with, the regulations concerning ADMISSION, REGISTRATION, FEES AND FINANCES stated on pages 13-28; the University regulations stated on pages 47-54; and the regulations concerning PROBATION AND SUSPENSION which are the same as those stated on pages 61-65 under the Junior College.*

### TRANSFER TO REGULAR STATUS

A "University student" may be transferred, at his request, to another college or school of the University only upon complying with the regulations of the specific college or school to which he wishes to transfer. The student should familiarize himself with the regulations printed in the University CATALOGUE concerning admission, residence, amount and quality of work. He should also specifically note the University regulations regarding transfers within the University on pages 49-50, and regarding graduation requirements on pages 51-53, and observe that when a student transfers into a degree-granting school or college, to be eligible for a degree he must meet not only all the general graduation requirements, but also such special requirements as may apply in his particular curriculum.

\*The President of the University, the Dean of Faculty, the Dean and the Assistant Dean of the Division of Students are officers of the Council.



## THE DIVISION OF SPECIAL STUDENTS

Warren Reed West, Ph.D., *Dean of the Division of Special Students*

### THE DEAN'S COUNCIL \*

Thelma Hunt

Carl Hugo Walther

Fred Salisbury Tupper

## GENERAL INFORMATION

### INTRODUCTORY

The Division of Special Students was organized in 1944. To this Division may be admitted students who are in the process of qualifying for degree candidacy. Students in this Division are designated "special students".

### REGULATIONS

*Students in the Division of Special Students are subject to, and are expected to familiarize themselves with, the regulations concerning ADMISSION, REGISTRATION, FEES AND FINANCES stated on pages 13-28; and the University regulations stated on pages 47-54.*

### SCHOLARSHIP

A student in this Division may be dropped for reasons of scholarship if his quality point index falls below 2.00.

The system of grading and computing scholarship is described in detail on pages 47 and 48.

### ACADEMIC SCHEDULE

The schedule of the "special student" is made up of courses required in the curriculum to which he wishes to transfer. The choice of courses must be approved by the Dean. If the student has not completed the language requirements of this curriculum at the time of his admission to the University, he must include three hours of language in each twelve hours of work until this requirement is met. Second- or third-group courses may not be taken unless all first-group requirements have been met or are being met concurrently.

\* The President of the University, the Dean of Faculty, and the Dean of the Division are members of the Council.

Credits earned at other institutions are evaluated at the time of admission to this Division. They are withheld until the Special Student transfers to a degree-granting college or school, when those appropriate to his curriculum are applied toward advanced standing.

**In each individual case, the schedule will be reduced when it is deemed advisable.**

#### TRANSFER TO REGULAR STATUS

A "special student" may transfer to a degree-granting college or school of the University when he has satisfactorily completed his program in the Division of Special Students and has met the admission requirements of the college or school to which he wishes to transfer. The student should familiarize himself with regulations printed in the University CATALOGUE concerning admission, residence, amount and quality of work. He should also specifically note the University regulations regarding transfer within the University on pages 49-50 and regarding graduation requirements on pages 51-53, and observe that when a student transfers into a degree-granting school or college, to be eligible for a degree he must meet not only all the general graduation requirements, but also such special requirements as may apply in his particular curriculum.

#### ADVISORY SYSTEM

Students in the Division of Special Students are expected to consult with an adviser in the Office of the Dean at least once each semester. Any student who has a question in regard to his status, or whose grades are below C, or who is in academic difficulty, is urged to make an appointment promptly without waiting for a request from the Dean.

## DIVISION OF AIR SCIENCE

Carl Swyter, B.S. in E.E., Colonel, United States Air Force, *Director of Air Science*

### MILITARY SERVICE DELAY AND AIR FORCE ROTC ADVANCED COURSE SELECTION BOARD\*

Robert Henry Mucha, *Chairman*

Martin Alexander Mason

George Martin Kroll

Harold Robert Henthorne

William Wightman Richardson III, *Recorder*

## GENERAL INFORMATION

### INTRODUCTORY

The Air Force Reserve Officers Training Corps (Air Force ROTC) unit was established at the University in 1957 under authority of Section 4027C, National Defense Act of June 3, 1948, as amended. Air Force personnel, approved by the President of the University, are detailed by the Department of the Air Force to supervise and conduct the Air Force ROTC program.

The mission of the Air Force ROTC program is to select and prepare students through a permanent program of instruction to serve as commissioned officers in the Regular and Reserve components of the United States Air Force. Classroom instruction and leadership training are provided to develop in the student the knowledge and the attributes of character, personality, and leadership required of officers in the United States Air Force. Emphasis is placed on arousing in the student a desire to serve his country as a flying officer.

### COURSE OF STUDY

The course of study is divided into a basic course covering the first two years and an advanced course covering the junior year, summer training unit, and senior year. Twenty-four hours of elective credit earned in this program may be applied toward a degree, three hours a semester for the basic course and three hours a semester for the advanced course.

The program takes into consideration the fact that many of the academic subjects in which college students are enrolled have a direct

\* The President of the University, the Dean of Faculty, and the Director of the Division are members ex officio of this Committee.



relationship to military as well as to civilian careers. The courses of the Air Force ROTC program have been carefully selected to supplement those academic subjects. They also afford a means for practical training in organization, leadership, and discipline, which will be of value in industrial or professional careers. The duties and responsibilities of squadron level officers, oral and written expression, and the techniques of problem solving are emphasized throughout the course both in theory and practice.

See "Department of Air Science" for a list of the subjects covered. In addition thereto, orientation flights and field trips to Air Force bases are available to selected cadets on a voluntary basis.

#### ELIGIBILITY REQUIREMENTS

Enrollment in the Division of Air Science is open to all full time men students and a limited number of women students, who are at least 14 years of age, citizens of the United States, physically fit, of good character, and candidates for Bachelor's degrees. Men and women enrolled in Air Force ROTC are designated Cadets and Cadettes, respectively. Cadets who successfully complete the basic course or have equivalent active military training may be selected to enter the advanced course. Cadets in the advanced course receive from the Government a subsistence allowance of approximately \$500, which is exempt from income tax. During the period of summer training the advanced cadet receives, in addition, \$75 a month, plus food, lodging, and travel expense. Uniforms, textbooks, and training materials are provided for all Air Science courses.

A cadet enrolling in the basic course must agree to successfully complete the two year course as a prerequisite to graduation from the University. A cadet applying for enrollment in the advanced course must, if selected, sign a contract to complete the course as a prerequisite to graduation; attend a four week summer training unit, and fulfill the obligations consecutive with military service delay specified below.

A limited number of junior women may enroll in the Air Force ROTC advanced course and, upon successful completion thereof and completion of requirements for a Bachelor's degree, may be commissioned as second lieutenants in the United States Air Force Reserve.

#### MILITARY SERVICE DELAY

Determent from induction under the Selective Service Act of 1951 may be granted to selected cadets within authorized quotas. Normally, a cadet is not considered for draft determent until he has completed one semester's work in the University, with a quality-point index of at least 2.00. A cadet's determent is subject to withdrawal if his quality point index falls below 2.00.



To receive a deferment a cadet must agree to complete the basic course, if enrolled therein; to complete the advanced course if selected for enrollment therein; to accept Reserve Commission if tendered; to serve on active duty for a period of not less than two years if called; and to remain a member of a reserve component of the Air Force for six years from the date of his commission.

It is the cadet's responsibility to notify his local draft board of this agreement and the termination thereof, as well as to notify the Director of Air Science whenever he intends to transfer to another institution.

#### STUDENT HONORARY MILITARY SOCIETIES

*The Arnold Air Society.*—A national honorary military society of Advanced Air Force ROTC cadets established to further the mission, traditions, and concept of the United States Air Force as a means of national defense, to promote American citizenship, and to create a close and more rewarding relationship among the Air Force ROTC cadets. The national organization founded in 1947, was named in honor of the late General of the Air Force Henry Harley Arnold. The local squadron established in 1952, was named in honor of General Carl Spaatz (retired), the first Chief of Staff of the United States Air Force. Only advanced Air Force ROTC cadets are eligible for election to membership. Members are authorized to wear a blue and gold augullette and ribbon on their cadet uniforms.

*Pershing Rifles.*—A national honorary military society founded in 1894 by Lieutenant (later General of the Armies) John Joseph Pershing. Its purpose is to encourage, preserve, and develop the highest ideals of the military profession, promote American citizenship, create a closer and more efficient relationship, and provide appropriate recognition of a high degree of cadet achievement. Only basic ROTC cadets are eligible for election to membership. Members are authorized to wear a blue and silver cord and ribbon on their cadet uniforms.

*Flying Sponsors.*—A local women's honorary organization established in 1952 to sponsor Air Force ROTC activities.

#### REGULATIONS

*Cadets and students in the Division of Air Science are subject to and are expected to familiarize themselves with the University regulations stated on pages 13-28 and 47-54; the regulations of the college, school, or division in which enrolled; and the regulations of the United States Air Force pertaining to Air Force ROTC cadets. Individual copies of Cadet Regulations are issued upon enrollment.*

## THE SUMMER SESSIONS

Burnice Herman Jarman, A.M., Ed.D., *Dean of the Summer Sessions*

### THE DEAN'S COUNCIL\*

Wood Gray

Ira Bowers Hansen

During the summer of 1957 the University offers an eight week session for undergraduate and graduate students in the Arts and Sciences. The Law School offers work in two six-week sessions. The School of Education offers a special six week session for teachers, with a pre-session of three weeks, post-session of three weeks, and a twelve week evening session.

During the summer of 1957, courses are offered in the Junior College, Columbian College (the senior college), the Law School, the School of Engineering, the School of Pharmacy, the School of Education, the School of Government, and the College of General Studies.

For a complete statement concerning summer-term work, see the Summer Sessions catalogue.

\* The President of the University, the Dean of Faculties, the Dean of the Summer Sessions, and the Dean of the Graduate School are members ex officio of the Council.

ADMINISTRATIVE UNITS





## HEALTH ADMINISTRATION

Richard Bernard Castell, A.B., M.D., *University Physician, Director*  
Benjamin Franklin Dean, Jr., M.S., M.D., *University Surgeon*  
Herbert Lamont Pugh, B.S., M.D., *University Physician*  
Gloria Godbey, A.B., M.D., *Associate University Physician*  
Robert Howe Harmon, A.B., M.D., *Associate University Physician*  
Ronald Atmore Cox, A.B., M.D., *Associate University Physician (Eye)*  
Alfred Brigulio, M.D., *Associate University Physician*  
Hugh Osgood House, A.B., M.D., *Associate University Physician (Nose and Throat)*  
Jerome Blaine Harrell, M.D., *Associate University Surgeon*  
Beatrice McBride, R.N., *Nurse-Secretary*

The University maintains a health service that is primarily diagnostic in its intent. For medical emergencies and health consultations there is, on the Campus, a Student Health Clinic open from 9:00 A.M. to 5:00 P.M. with physician and nurse in attendance. There is also a rest room for women, with a graduate nurse in charge.

Medical privileges include: (1) the physical examination of every student entering from secondary school;\* (2) three visits by the University physician or surgeon, office or residence (District of Columbia), in any one illness, exclusive of a specialist, surgical operation, laboratory, or X ray examination; (3) hospitalization, including board and nursing, in the University Hospital for not more than one week during any twelve month period—the necessity to be determined by the Director of Health Administration. The duration of hospitalization period (maximum, one week) is also to be determined by the Director of Health Administration.

This medical benefit does not apply to illness or disability incurred previous to the University term or prior to payment of tuition fees.

The student is allowed, if he so desires, to engage physicians and nurses of his own choice, but when he does so he will be responsible for the fees charged.

Rules: (1) The Director of Health Administration is empowered to limit or deny the medical benefits where, in his discretion, a student has by his misconduct or breach of the rules of the University, made himself ineligible; (2) the Director of Health Administration has authority to determine the necessity and length of hospitalization; (3) a student who has severed his connection with the University is ineligible for

\* A student is eligible for a physical examination by the University if a student has not been so examined within the previous five years.

medical benefits; (4) a student intending to train for an athletic team is required to pass a thorough examination at the beginning of each semester; (5) the above regulations apply also during the summer term of the University.

The University is not responsible for injuries received in inter-collegiate or intramural games, or in any of the activities of the physical education departments.

## VETERANS EDUCATION

Don Carlos Faith, Ph.D., *Director of Veterans Education*

The George Washington University is approved to provide training for eligible persons under the provisions of Public Laws 346, 347, 350, 394, and 634. The Office of Veterans Education, Building Q, 2020 H Street NW., operates as a service bureau for such persons interested in studying at the University and acts in a liaison capacity between the University and the Veterans Administration. Here information may be obtained concerning the educational program of the University and the procedures for securing educational benefits under the GI and War Orphan bills. Eligible persons will often find it to their advantage to seek advice at the University Office of Veterans Education before applying to the Veterans Administration for a Certificate.

### PUBLIC LAW 634

#### (War Orphans Educational Assistance Act)

A child of a person who died of a disease or injury incurred or aggravated while on active duty in the Armed Forces during World War I, World War II, or the Korean Conflict may be eligible for educational assistance under this Act, if certain age requirements are met. In the case of a child who has not reached the age of majority, his guardian must make application for him to the Veterans Administration. For further information concerning the benefits available under this Law, consult the University Office of Veterans Education or the Veterans Administration, Munitions Building, Constitution Avenue at Twentieth Street NW., Washington 25, D.C.

### PUBLIC LAW 346

#### (World War II GI Bill)

The educational benefits for veterans under Public Law 346 terminated July 25, 1956, except as described below.

The Armed Forces Voluntary Recruitment Act of 1945 (Public Law 190) provided that persons enlisting or reenlisting in the Armed Forces between October 6, 1945, and October 5, 1946, may count the entire period of such enlistment or reenlistment as war service for purposes of GI Bill benefits. Such enlistees have four years from the date that enlistment ended to begin training and nine years from that separation date to complete training under this provision.

It is suggested that a veteran having any question regarding his eligi-



bility consult the University Office of Veterans Education or the Veterans Administration, Munitions Building, Constitution Avenue at Twentieth Street NW., Washington 25, D.C.

PUBLIC LAW 550

(Korean GI Bill)

In order to be eligible for the benefits under this GI Bill, a veteran must have been in service between June 27, 1950 and January 31, 1955, and must no longer be on active duty. For further information concerning these benefits, consult the University Office of Veterans Education or the Veterans Administration, Munitions Building, Constitution Avenue at Twentieth Street NW., Washington 25, D. C.

At least thirty days prior to registration the veteran wishing to attend under this GI Bill should apply to the Veterans Administration for a Certificate for Education and Training, for presentation to the University Office of Veterans Education at the time of registration. A photostatic copy of his DD214 must accompany the original application for certification.

PUBLIC LAWS 16 AND 894

(Vocational Rehabilitation)

Disabled veterans desiring vocational rehabilitation under either GI Bill should apply to Veterans Administration, Munitions Building, Constitution Avenue at Twentieth Street NW., Washington 25, D. C., for approval of their training objectives at least sixty days prior to registration.

SERVICE SCHOOL CREDITS

A limited amount of credit earned in service schools since 1941 may be considered for assignment to qualified degree candidates in accordance with faculty regulations of the Junior College, Columbian College, the School of Engineering, and the School of Government. To be considered for such credit, veterans should submit to the Director of Admissions photostatic copies of their service school records, indicating courses successfully completed with sufficient identification of the course to locate it in the Guide to Evaluation of Educational Experience in the Armed Forces.



## COMMUNITY AND UNIVERSITY SERVICES

### THE READING CLINIC

Mary Ellen Coleman, A.M., *Director of the Reading Clinic*

The Reading Clinic, 802 Twenty-first Street N.W., offers individual diagnostic and corrective services for all levels: primary, elementary, secondary, and adult. In addition special reading improvement classes are conducted on the high school and adult level.

A complete diagnosis includes psychological tests: vision, hearing, and dominance tests as well as the various reading and spelling tests. Results are interpreted and a written report is presented in conference with the parents or the individual.

The special reading classes for high school students and adults are offered throughout the year at stated intervals. Emphasis is placed on improvement of vocabulary, speed, comprehension, and study skills. Machines such as the tachistoscope, rate accelerator, and controlled reader are also used for increasing speed of comprehension.

*Fees.*—The fee for individual diagnosis is \$25; for individual instruction, \$3.50 an hour; for instruction in small groups with common reading difficulties, \$2.50 an hour; for materials, \$1. All fees are payable in advance at the Office of the Cashier.

### THE SPEECH CLINIC

Calvin Wei Pettit, Ph.D., *Director of the Speech Clinic*

The Speech Clinic, Lisner Auditorium, 730 Twenty-first Street N.W., offers diagnostic and corrective work for children and adults with such speech difficulties as stuttering, lispings, cleft palate, cerebral palsy, aphasia, foreign accent, voice, and articulatory problems.

*Fees.*—There is no charge for the diagnosis. The fee for individual instruction is \$7 an hour; for group instruction, \$4 an hour. Fees are payable at the Office of the Cashier.

### THE TESTING AND COUNSELING CENTER

Mary Elizabeth Barker, Ph.D., *Head of the Testing and Counseling Center*

The Testing and Counseling Center, 718 Twenty-first Street N.W., offers services which are available to students enrolled in the University, to high school students, and to adults of the community.

The services are designed to: assist individuals in the evaluation of their educational and vocational potentialities and objectives; diagnose academic difficulties; provide educational and vocational literature and information; and refer individuals to qualified agencies for assistance with problems not handled by the Center.

Special testing services provided by the Center include the administration of General Educational Development Tests, Miller Analogies Test, Minnesota Engineering Analogies Test, admissions tests for the University and for other educational institutions, and tests for business and industry.

*Fees.*—Except for specialized testing, the fee covers testing and counseling based on the results of the tests. For students currently enrolled in the University, the fee is \$7.50; for former students and community clients under twenty-one years of age, \$10; for community clients over twenty-one, \$45. Fees for specialized testing are dependent upon the services involved. All fees are payable at the Office of the Center.

COURSES OF INSTRUCTION





## COURSES OF INSTRUCTION

On the following pages of this CATALOGUE, under the alphabetically arranged names of the departments of instruction, are listed the courses of instruction offered by the University in the summer of 1957 and in the academic year 1957-58. The courses as here listed are subject to some slight change. The University reserves the right to withdraw any course announced.

### HOURS OF INSTRUCTION

Courses of instruction are scheduled in the morning, afternoon, and evening. Evening classes are identical with daytime sections of corresponding courses, are taught by the same instructors, and carry the same amount of credit. By taking the evening and summer classes and extending the time of study beyond the customary four years, a student who is able to give only part of his time to college work may complete a regular curriculum and obtain a degree.

### EXPLANATION OF COURSE NUMBERS

In the departments of the School of Medicine, first-year courses are numbered from 101 to 200; second-year courses, from 201 to 300; third-year courses, from 301 to 400; and fourth-year courses, from 401 to 500. This includes courses open to both medical and nonmedical students. Courses limited to nonmedical students follow the numbering system used in "all other schools and colleges" (see below).

In the Law School, first-year courses are numbered from 101 to 200; second-year courses, from 201 to 300; third-year courses, from 301 to 400; and graduate courses, from 401 to 500.

In all other schools and colleges the following system of numbering is used:

*First group courses.*—Courses numbered from 1 to 100 are planned for students in the freshman and sophomore years. With the approval of the adviser and the dean, they may also be taken by juniors and seniors. In certain instances, they may be taken by graduate students to make up undergraduate deficiencies or as prerequisites to advanced courses, but they may not be credited toward a higher degree.

*Second group courses.*—Courses numbered from 101 to 200 are planned for students in the junior and senior years. They may be credited toward higher degrees only when registration for graduate credit has been approved at the beginning of the course by the dean responsible for

the graduate work and by the officer of instruction, and when the completion of additional work has been certified by the officer of instruction.

*Third-group courses.*—Courses numbered from 201 to 300 are planned primarily for graduate students. They are open, with the approval of the officer of instruction, to qualified seniors; they are not open to Junior College students or other undergraduates.

#### INDICATION OF THE AMOUNT OF CREDIT

The number of semester hours of credit given for the satisfactory completion of a course is, in most cases, indicated in parentheses after the name of the course. Thus, a year course giving three hours of credit each semester is marked (3-3), and a semester course giving three hours of credit is marked (3). A semester hour usually consists of the completion of one fifty-minute period of class work or of one laboratory period a week for one semester.

## ACCOUNTING

Ralph Dale Kennedy, Ph.D., *Professor of Accounting, Executive Officer*  
 Orton Wells Boyd, A.M., C.P.A., *Professional Lecturer in Accounting*  
 Edwin Lewis, M.B.A., *Professional Lecturer in Accounting*  
 Clarence McLaughlin, B.S., LL.B., *Professional Lecturer in Accounting*  
 Forest Carlyle Brimacombe, M.B.A., *Professional Lecturer in Accounting*

Ira Ernest Steele, A.M., *Professional Lecturer in Accounting*  
 James Leonard Buckler, A.M., *Professional Lecturer in Accounting*  
 Harold Jerome Bobys, A.B., C.P.A., *Professional Lecturer in Accounting*

Fernand Vincent Demaret, M.S., *Professional Lecturer in Accounting*  
 Frank Higginbotham, M.S., C.P.A., *Professional Lecturer in Accounting*  
 Milford Kirtland Kellogg, Ph.D., C.P.A., *Professional Lecturer in Accounting*

Frederick Charles Kartz, M.B.A., C.P.A., *Associate Professor of Accounting*  
 ————, *Associate Professor of Accounting*

Wilbur Earle Benson, M.B.A., *Assistant Professor of Accounting*

*Associate in Arts (Junior College)*—Two-year vocational curriculum in Accounting.—For curriculum, see page 71.

*Bachelor of Arts and Master of Arts in Commerce with a major in Accounting (School of Government)*—See pages 65-66, 70, 185-86, 189-90, and 191-93, 194.

### FIRST GROUP

#### 1-2 *Introductory Accounting* (3-3)

THE SUE

*First half*: fall—morning and evening; spring—morning and evening, summer 1957. *Second half*: fall—morning and evening; spring—morning and evening; summer 1957.

Basic principles and procedures underlying the accounting records used by major proprietorships, partnerships, and corporations; preparation of the work sheet and financial statements; introduction to cost accounting; analysis of financial statements; valuation and income determination problems. Prerequisite to Accounting 2: Accounting 1 or permission of the instructor.

#### *General Accounting* (1)

Not offered 1957-58.

Accounting theory and practice with emphasis on terminology and the analysis and interpretation of accounting data. Designed for those who need only a survey of accounting.



## SECOND GROUP

- 101
- Cost Accounting*
- (3) Benson, ———

Fall—morning and evening; summer 1957.

Theory and purposes of industrial cost accounting; treatment of systems of cost control and determination; analysis and interpretation of cost data. Prerequisite: Accounting 1-2.

- 111
- Financial Statement Analysis*
- (3) Kennedy, Steele

Fall—morning; spring—evening, summer 1957.

Methods and techniques of preparing, analyzing, and interpreting financial statements for the purposes of assisting executives, directors, stockholders, and creditors; influence of price level changes on accounting data; determination and interpretation of trends and ratios.

- 121-22
- Intermediate Accounting*
- (3-3) Benson, Higginbotham

Academic year—morning and evening

Valuation and income determination problems; treatment of depreciation, good, and business succession; the partnership, pooling, operations, and dissolution of partnerships and corporations. Prerequisite: Accounting 1-2. Prerequisite to 123 Accounting 123.

- 132
- Accounting Theory*
- (3) Kennedy, Kurtz

Spring—morning, summer 1957.

Development of basic accounting principles and concepts with special reference to current theories suggested by the American Institute of Accountants and the American Accounting Association. Prerequisite: 6 hours of accounting.

- 141
- Governmental Accounting*
- (3) Lewis

Fall—evening.

Problems relating to governmental appropriation accounts, expenditures, and fund accounting. Emphasis on state, city and state government accounting with an introduction to federal accounting. Prerequisite: Accounting 1-2 or permission of the instructor.

- 142
- Federal Accounting*
- (3) Lewis

Spring—evening.

Accounting system and process of the Federal Government. Prerequisite: Accounting 141 or permission of the instructor.

- 151
- Governmental Budgeting—Formulation and Adoption*
- (3) Buckler

Fall—evening.

Development of budgetary theory and current techniques; presentation



and problems relating to the formulation and adoption of municipal, state, and federal government budgets.

- 152 *Governmental Budgeting—Administration* (3) Buckler  
Spring—evening.

Theory, practices, procedures, and problems involved in the evaluation and administration of financial systems for municipal, state, and federal governments. Prerequisite: Accounting 151 or permission of the instructor.

- 161 *Income Tax Accounting* (3) Kurtz, Boyd, McLaughlin  
Fall—morning and evening.

Problems involved in the federal income taxation of individuals and corporations; differences between tax accounting and financial accounting; social security taxes. Prerequisite: Accounting 1-2.

- 162 *Federal Tax Practice* (3) Kurtz, Boyd, McLaughlin  
Spring—morning and evening.

Advanced problems of federal tax practice such as the tax treatment of partnerships, estates, trusts, corporate reorganizations, through income splits. Use of the tax service. Assessment, valuation, and other specialties. Prerequisite: Accounting 161 or the permission of the instructor.

- 171 *Auditing* (3) Kurtz, ————  
Fall—evening; spring—morning, summer 1957.

Duties and responsibilities of auditors; principles and procedures in making audits; techniques of auditing such financial statements; verification of audit working papers and reports. Prerequisite: Accounting 121-22.

- 181 *Accounting Systems* (3) Lewis  
Fall—evening.

Theory and procedure of designing and installing accounting systems for collecting, recording, analyzing, and presenting accounting data. Prerequisite: Accounting 1-3, 121-22, and 171 or permission of the instructor.

- 191 *Advanced Accounting* (3) Balys  
Fall—evening.

Consolidated statements, statement of affairs, revaluation and liquidation reports, and estate and trust accounting. Prerequisite: Accounting 121-22.

193 *Business Budgeting* (3) \_\_\_\_\_, Buckler

Fall—morning; spring—evening; summer 1957.

Principles, techniques, and procedures involved in the development, installation, and operation of a system of budgetary control to aid in the management of commercial and industrial organizations. Prerequisite: Accounting 1-2.

194 *Business Budgeting—Practice and Problems* (3) Buckler

Not offered 1957-58.

Practical application of budget principles and techniques, advanced problems involved in general budgetary administration for management control purposes in commercial and industrial business. Prerequisite: Accounting 193 or permission of the instructor.

198 *Professional Accounting Review* (3) Bobys

Spring—evening.

Review and coordination of the principles and techniques developed in the accounting curriculum, in preparation both for general practice in the field of accountancy and for professional accounting examinations. Prerequisite: Accounting 131, 141, 162, 171, and 191, or permission of the instructor.

## THIRD GROUP

202 *Advanced Cost Accounting* (3) \_\_\_\_\_

Spring—evening.

Advanced cost accounting theory and problems with emphasis on development and analysis of standard costs, the use of cost data for managerial control, and distribution cost accounting. Prerequisite: Accounting 161 or permission of the instructor.

212 *Managerial Accounting* (3) Kennedy

Spring—evening, summer 1957.

Accounting system with special reference to the use of financial and managerial accounts as a tool of management, emphasis on managerial control, accounting control, accounting reports, and the use of budgets and cost data in planning and controlling business. Prerequisite: 9 hours of accounting or permission of the instructor.

231 *Contemporary Accounting Theory* (3) Kennedy

Not offered 1957-58.

Advanced accounting principles and concepts and recent theories concerned with the valuation of assets and determination of income. Admission by permission of the instructor.

240 *Governmental Accounting and Budgeting Problems* (3)

Lewis

Not offered 1957-58

Advanced principles and practices in federal accounting relative to general policy and administration. Prerequisite: Accounting 142 and 152, or permission of the instructor.

272 *Auditing Practice* (3)

Spring—evening.

Preparation of audit reports, accounting statements to be filed with Securities and Exchange Commission, current developments of auditing standards and practice. Prerequisite: Accounting 171 or permission of the instructor.

275 *Internal Control and Auditing* (3)

Kellogg

Fall—evening.

Internal accounting controls; review and appraisal of accounting systems and procedures; managerial policies with respect to their effectiveness and profitability. Emphasis on the use of internal control and auditing as an aid to management. Prerequisite: Accounting 171 or permission of the instructor.

295-306 *Seminar in Accounting* (3-3)

Kennedy

First half—not offered 1957-58; second half 1A—evening.

Select accounting research topics and problems in individual and written reports. Admission by permission of the instructor.

299-300 *Thesis* (3-3)

The Staff

Academic year—as arranged, summer 1957.

#### COURSES OFFERED IN SPECIAL PROGRAMS

In addition to the regular courses announced above, the University offers the following accounting courses especially for students enrolled in the following special programs: Navy Graduate Comptroller's Program, Air Force Advanced Management Program, and Engineering Administration.

3 *General Accounting* (2)

204 *Cost Accounting* (2)

211-12 *Managerial Accounting* (3-3)

241-42 *Governmental Budgeting: Formulation and Administration* (3-3)

253 *Survey of Governmental Budgeting* (3)

275 *Internal Control and Auditing* (3)



## AIR SCIENCE

Carl Swyter, B.S. in E.E., Colonel, United States Air Force, *Professor of Air Science, Executive Officer*

Robert Henry Mutha, M.B.A., Major, United States Air Force, *Assistant Professor of Air Science*

Harold Robert Henthorne, A.B., Captain, United States Air Force, *Assistant Professor of Air Science*

William Wighman Richardson III, A.B., First Lieutenant, United States Air Force, *Assistant Professor of Air Science*

Virginia Bernhiser, B.S., First Lieutenant, United States Air Force, *Assistant Professor of Air Science*

James Mitar Miklovich, Master Sergeant, United States Air Force, *Instructor in Air Science*

James John Quarto, Master Sergeant, United States Air Force, *Instructor in Air Science*

Gerald Cleveland Purcell, Technical Sergeant, United States Air Force, *Instructor in Air Science*

Leonard Edward LaBrecque, Jr., Staff Sergeant, United States Air Force, *Instructor in Air Science*

*Training Certificate*—This certificate is awarded upon satisfactory completion of the Basic Air Force ROTC course of instruction.

*Commission in the United States Air Force Reserve*.—Upon being awarded a Bachelor's degree and upon the satisfactory completion of the Air Force ROTC course of instruction prescribed by law and regulations, the graduate may be appointed Second Lieutenant, United States Air Force Reserve.

### BASIC COURSE

#### 1-2 *Leadership Laboratory—Freshman Year (1-1)* The Staff

Academic year—afternoon

Cadet basic airman training. Military courtesy, discipline, appearance, and bearing; ground flight, weapons, and some knowledge of missiles and armaments. Minimum: 12 hours of instruction. The student must attend no less than a year, 80% (May be substituted for 1 hour of instruction, 1-2).

#### 11-12 *Leadership Laboratory—Sophomore Year (1-1)* The Staff

Academic year—afternoon

Cadet intermediate-level officer training. Military bearing and courtesy, all phases of drills and ceremonies, advanced weapons training and advanced armaments. Prerequisite: Air Science required Air Science (1-2).



21-22 for men and Air Science 1-2 for women. Minimum 15 hours a semester. Dry-cleaning fee charged one time a year, \$2. (May be substituted for Physical Education 11-12.)

21-22 *Air Science I—Freshman Year (2-2)* Richardson

Academic year; 2 hours a week—morning and afternoon.

Introduction to aviation, fundamentals of global geography, international relations and security organizations, military instruments of national security.

51-52 *Air Science II—Sophomore Year (2-2)* Henthorne

Academic year; 2 hours a week—morning and afternoon.

Careers in the United States Air Force; elements of aerial warfare, targets, weapons, aircraft, bases, and operations. Prerequisite: Air Science 21-22 or equivalent active military training.

#### ADVANCED COURSE

101-2 *Air Science III—Junior Year (3-3)* Mucha

Academic year; 4 hours a week—morning.

The Air Force Commander and his Staff, creative problem solving, communicating in the Air Force, interacting in the Air Force, military justice, air navigation, weather, Air Force base functions. Selection by a board of University and Air Force officials is required.

103-4 *Leadership Laboratory—Junior Year* The Staff  
(Credit is a part of Air Science 101-2)

Academic year—afternoon.

Cadet non-commissioned officer and cadet training. Wearing of the uniform, parades and ceremonies, marching and ceremonial drill. Cadets perform duties involving planning for and supervising of Cadet Corp activities. Emphasis placed on leadership and management proficiency. Minimum 15 hours a semester.

105 *Summer Training Unit—Between Junior and Senior Years (required)* The Staff

Attendance at a four-week Air Force ROTC summer training unit at an Air Force base within continental United States is mandatory between the junior and senior years. Program consists of basic orientation, physical training, individual weapons, Air Force base activity and equipment, field exercises, air base problems, and emergency training.

151-52 *Air Science IV—Senior Year (3-5)*

Mucha

Academic year: 4 hours a week—morning.

Leadership and management seminar; military aviation and the evolution of warfare; military aspects of world political geography; briefing for commissioned service.

153-54 *Leadership Laboratory—Senior Year*  
(Credit is a part of Air Science 151-52)

The Staff

Academic year—afternoon.

Cadet officer training. Cadet officers conduct activities of Corps of Cadets through chain of command, instruct subordinates, plan and supervise Cadet Corps training and administration. Preparation for commissioned officer duties. Development of leadership and managerial responsibilities. Minimum 15 hours per semester.

## ANATOMY

Ira Rockwood Telford, Ph.D., *Professor of Anatomy, Executive Officer*

Paul Calabrisi, Ph.D., *Professor of Anatomy*

Webb Edward Haymaker, M.D., M.S., *Professorial Lecturer in Anatomy*

Gerald Fred Hungertord, Ph.D., *Assistant Professor of Anatomy*

Frank Duane Allan, Ph.D., *Assistant Professor of Anatomy*

Thomas Nick Johnson, Ph.D., *Assistant Professor of Anatomy*

Dora Papara-Nicholson, M.D., *Assistant Research Professor of Anatomy*

Wilfred Walter Eastman, B.S., M.D., *Clinical Instructor in Anatomy*

Lloyd Eugene Church, D.D.S., M.S., *Clinical Instructor in Anatomy*

Raymond Nathan Brown, M.D., *Clinical Instructor in Anatomy*

Lysle Westley Williams, A.B., M.D., *Clinical Instructor in Anatomy*

### SPECIAL LECTURER

Joseph Vitold Michalski, Ph.D., *Anatomist, Medical Museum Laboratory, Walter Reed Hospital; Anatomy*

*Master of Science in the field of Anatomy (Columbia College)*—Prerequisite: a Bachelor of Arts or Bachelor of Science degree from the University or the equivalent, with a major in Biology, Chemistry, or Zoology. The undergraduate program must include the following courses (or the equivalent): Chemistry 11-12, 21, 151-152; Physics 6, 7; Zoology 1-2, 41-42. Biochemistry 221-22 is recommended as an elective.

*Required*—The general requirements as stated on pages 87-91. The thirty semester hours of graduate work must include Anatomy 203, 204, 205, 221-22, 223-24, 225-26, and graduate courses in histology, physiology, or related fields selected with the approval of the Department. It is not always possible to attend courses and research so that the student can be assured of completing all the required work in one academic year.

*Doctor of Philosophy (Graduate Council)*—See page 95.

#### 101-2 *Gross Anatomy*

Calabrisi and Staff

Academic year: fall—12 hours a week; spring—8½ hours a week.

Regional dissection of the human body, supplemented with lectures and quiz sections. Study of X-ray anatomy to emphasize the functional aspects of the position, shape, and relation of the viscera and skeletal components.

#### 103 *Human Embryology*

Allan and Staff

Fall—3 hours a week.

The origin and development of the human body. Special emphasis on

the value of embryology in interpreting anatomical anomalies and variations as seen in gross dissection, surgery, obstetrics, and pathology.

- 104 *Neuroanatomy* Johnson and Staff  
Spring—5½ hours a week.

The macroscopic and microscopic study of the central nervous system and the special sense organs. Emphasis on such dynamic aspects as development, pathways, lesions, etc.

- 105 *Microscopic Anatomy* Telford and Staff  
Fall—9 hours a week.

Study of the detailed minute structure of cells, tissues, and organs of the human body, with emphasis on the relation of structure to function. Recognition and interpretation of histological sections based on practical examinations.

- 106 *Living Anatomy* The Staff  
Spring—1 hour a week.

An introduction to physical diagnosis, with special emphasis on topographical anatomy.

- 201-2 *Gross Anatomy* (8-6) Calabrisi and Staff  
Academic year—as arranged.

For pre-medical and medical graduate students. Same as Anatomy 101-2. Anatomy 201—laboratory fee, \$21; Anatomy 202—laboratory fee, \$16.

- 203 *Human Embryology* (2) Allen and Staff  
Fall—as arranged.

For pre-medical and medical graduate students. Same as Anatomy 103. Laboratory fee, \$8.

- 204 *Neuroanatomy* (4) Johnson and Staff  
Spring—as arranged.

For pre-medical and medical graduate students. Same as Anatomy 104. Laboratory fee, \$13.

- 205 *Microscopic Anatomy* (4) Telford and Staff  
Fall—as arranged.

For pre-medical and medical graduate students. Same as Anatomy 105. Laboratory fee, \$13.



- 221-22 *Seminar* (1-1) Hungerford and Staff  
Academic year: 1 hour a week—as arranged.  
Reports and discussions of special topics by the Staff and graduate students. For graduate liberal arts students. Regular medical students are encouraged to attend.
- 295-96 *Research* (arr.) The Staff  
Academic year—as arranged.  
Fees to be arranged.
- 299-300 *Thesis* (3-3) The Staff

## ANESTHESIOLOGY

Charles Seymour Cookley, M.D., *Professor of Anesthesiology, Executive Officer*

Donald Harrison Stubbs, A.M., M.D., *Clinical Professor of Anesthesiology*

Seymour Alpert, A.B., M.D., *Associate Professor of Anesthesiology*

Cunningham Ramsey MacCordy, M.D., *Assistant Professor of Anesthesiology*

Paula Reines Kaiser, M.B., Ch.B., M.D., *Associate in Anesthesiology*

Salomon Naphtali Alpert, A.B., M.D., *Clinical Instructor in Anesthesiology*

William Eldridge Bageant, M.D., *Clinical Instructor in Anesthesiology*

Allen Widome, M.D., *Clinical Instructor in Anesthesiology*

Charles Gruenwald, A.B., M.D., *Clinical Instructor in Anesthesiology*

### 320 *Anesthesiology*

The Staff

Spring—1 hour a week.

Review of basic sciences, correlation between basic sciences and clinical work.

### 421-22 *Anesthesia Seminar*

The Staff

Academic year—1 hour a week.

Students attend anesthesia seminars during their surgical clinical clerkships, University Hospital.

### 433-34 *Advanced Anesthesiology*

The Staff

Academic year—as arranged.

Students are introduced through the work of the semesters to a period of two weeks and assisted to work in the operating rooms and to attend conferences and seminars. For the more advanced students a three week elective is offered.

## ART

Donald Chenoweth Kline, B.Arch., M.F.A., *Professor of Art, Executive Officer*

Grose Evans, B.F.A., Ph.D., *Professorial Lecturer in Art*

Laurence Pereira Leite, A.M., *Assistant Professor of Art*

### STAFF IN THE CORCORAN SCHOOL OF ART

DRAWING AND PAINTING: Richard Lahey, Principal; Edmund Archer, Jessalce Sickman, John Lewis

SCULPTURE AND CARVING: Heinz Warneke

COMMERCIAL ART: Edward Forrest Walton

*Bachelor of Arts with a major in (1) Art History and Theory, (2) Drawing and Painting, (3) Sculpture, and (4) Commercial Art for admission College—Degree in Art.*

*The major in Art History and Theory.*—Prerequisite: the Arts and Letters curriculum in the Junior College, or the equivalent, including Art 11-12 and six hours selected from the following: 65, 66, 71-72.

Required: satisfaction of the general requirements stated on pages 80-86, twenty-four semester hours in Art, which must include Art 1-11, 1-2, 1-3, 1-4, 1-7, 1-10, 161-62; twelve hours selected from Art 1-8, 1-11, 1-12, 1-13, 1-14, 1-15, 1-16, 1-17, 1-18, 1-19, 1-20, 1-21, 1-22, 1-23, 1-24, 1-25, 1-26, 1-27, 1-28, 1-29, 1-30, 1-31, 1-32, 1-33, 1-34, 1-35, 1-36, 1-37, 1-38, 1-39, 1-40, 1-41, 1-42, 1-43, 1-44, 1-45, 1-46, 1-47, 1-48, 1-49, 1-50, 1-51, 1-52, 1-53, 1-54, 1-55, 1-56, 1-57, 1-58, 1-59, 1-60, 1-61, 1-62, 1-63, 1-64, 1-65, 1-66, 1-67, 1-68, 1-69, 1-70, 1-71, 1-72, 1-73, 1-74, 1-75, 1-76, 1-77, 1-78, 1-79, 1-80, 1-81, 1-82, 1-83, 1-84, 1-85, 1-86, 1-87, 1-88, 1-89, 1-90, 1-91, 1-92, 1-93, 1-94, 1-95, 1-96, 1-97, 1-98, 1-99, 1-100, 1-101, 1-102, 1-103, 1-104, 1-105, 1-106, 1-107, 1-108, 1-109, 1-110, 1-111, 1-112, 1-113, 1-114, 1-115, 1-116, 1-117, 1-118, 1-119, 1-120, 1-121, 1-122, 1-123, 1-124, 1-125, 1-126, 1-127, 1-128, 1-129, 1-130, 1-131, 1-132, 1-133, 1-134, 1-135, 1-136, 1-137, 1-138, 1-139, 1-140, 1-141, 1-142, 1-143, 1-144, 1-145, 1-146, 1-147, 1-148, 1-149, 1-150, 1-151, 1-152, 1-153, 1-154, 1-155, 1-156, 1-157, 1-158, 1-159, 1-160, 1-161, 1-162, 1-163, 1-164, 1-165, 1-166, 1-167, 1-168, 1-169, 1-170, 1-171, 1-172, 1-173, 1-174, 1-175, 1-176, 1-177, 1-178, 1-179, 1-180, 1-181, 1-182, 1-183, 1-184, 1-185, 1-186, 1-187, 1-188, 1-189, 1-190, 1-191, 1-192, 1-193, 1-194, 1-195, 1-196, 1-197, 1-198, 1-199, 1-200, 1-201, 1-202, 1-203, 1-204, 1-205, 1-206, 1-207, 1-208, 1-209, 1-210, 1-211, 1-212, 1-213, 1-214, 1-215, 1-216, 1-217, 1-218, 1-219, 1-220, 1-221, 1-222, 1-223, 1-224, 1-225, 1-226, 1-227, 1-228, 1-229, 1-230, 1-231, 1-232, 1-233, 1-234, 1-235, 1-236, 1-237, 1-238, 1-239, 1-240, 1-241, 1-242, 1-243, 1-244, 1-245, 1-246, 1-247, 1-248, 1-249, 1-250, 1-251, 1-252, 1-253, 1-254, 1-255, 1-256, 1-257, 1-258, 1-259, 1-260, 1-261, 1-262, 1-263, 1-264, 1-265, 1-266, 1-267, 1-268, 1-269, 1-270, 1-271, 1-272, 1-273, 1-274, 1-275, 1-276, 1-277, 1-278, 1-279, 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1-423, 1-424, 1-425, 1-426, 1-427, 1-428, 1-429, 1-430, 1-431, 1-432, 1-433, 1-434, 1-435, 1-436, 1-437, 1-438, 1-439, 1-440, 1-441, 1-442, 1-443, 1-444, 1-445, 1-446, 1-447, 1-448, 1-449, 1-450, 1-451, 1-452, 1-453, 1-454, 1-455, 1-456, 1-457, 1-458, 1-459, 1-460, 1-461, 1-462, 1-463, 1-464, 1-465, 1-466, 1-467, 1-468, 1-469, 1-470, 1-471, 1-472, 1-473, 1-474, 1-475, 1-476, 1-477, 1-478, 1-479, 1-480, 1-481, 1-482, 1-483, 1-484, 1-485, 1-486, 1-487, 1-488, 1-489, 1-490, 1-491, 1-492, 1-493, 1-494, 1-495, 1-496, 1-497, 1-498, 1-499, 1-500, 1-501, 1-502, 1-503, 1-504, 1-505, 1-506, 1-507, 1-508, 1-509, 1-510, 1-511, 1-512, 1-513, 1-514, 1-515, 1-516, 1-517, 1-518, 1-519, 1-520, 1-521, 1-522, 1-523, 1-524, 1-525, 1-526, 1-527, 1-528, 1-529, 1-530, 1-531, 1-532, 1-533, 1-534, 1-535, 1-536, 1-537, 1-538, 1-539, 1-540, 1-541, 1-542, 1-543, 1-544, 1-545, 1-546, 1-547, 1-548, 1-549, 1-550, 1-551, 1-552, 1-553, 1-554, 1-555, 1-556, 1-557, 1-558, 1-559, 1-560, 1-561, 1-562, 1-563, 1-564, 1-565, 1-566, 1-567, 1-568, 1-569, 1-570, 1-571, 1-572, 1-573, 1-574, 1-575, 1-576, 1-577, 1-578, 1-579, 1-580, 1-581, 1-582, 1-583, 1-584, 1-585, 1-586, 1-587, 1-588, 1-589, 1-590, 1-591, 1-592, 1-593, 1-594, 1-595, 1-596, 1-597, 1-598, 1-599, 1-600, 1-601, 1-602, 1-603, 1-604, 1-605, 1-606, 1-607, 1-608, 1-609, 1-610, 1-611, 1-612, 1-613, 1-614, 1-615, 1-616, 1-617, 1-618, 1-619, 1-620, 1-621, 1-622, 1-623, 1-624, 1-625, 1-626, 1-627, 1-628, 1-629, 1-630, 1-631, 1-632, 1-633, 1-634, 1-635, 1-636, 1-637, 1-638, 1-639, 1-640, 1-641, 1-642, 1-643, 1-644, 1-645, 1-646, 1-647, 1-648, 1-649, 1-650, 1-651, 1-652, 1-653, 1-654, 1-655, 1-656, 1-657, 1-658, 1-659, 1-660, 1-661, 1-662, 1-663, 1-664, 1-665, 1-666, 1-667, 1-668, 1-669, 1-670, 1-671, 1-672, 1-673, 1-674, 1-675, 1-676, 1-677, 1-678, 1-679, 1-680, 1-681, 1-682, 1-683, 1-684, 1-685, 1-686, 1-687, 1-688, 1-689, 1-690, 1-691, 1-692, 1-693, 1-694, 1-695, 1-696, 1-697, 1-698, 1-699, 1-700, 1-701, 1-702, 1-703, 1-704, 1-705, 1-706, 1-707, 1-708, 1-709, 1-710, 1-711, 1-712, 1-713, 1-714, 1-715, 1-716, 1-717, 1-718, 1-719, 1-720, 1-721, 1-722, 1-723, 1-724, 1-725, 1-726, 1-727, 1-728, 1-729, 1-730, 1-731, 1-732, 1-733, 1-734, 1-735, 1-736, 1-737, 1-738, 1-739, 1-740, 1-741, 1-742, 1-743, 1-744, 1-745, 1-746, 1-747, 1-748, 1-749, 1-750, 1-751, 1-752, 1-753, 1-754, 1-755, 1-756, 1-757, 1-758, 1-759, 1-760, 1-761, 1-762, 1-763, 1-764, 1-765, 1-766, 1-767, 1-768, 1-769, 1-770, 1-771, 1-772, 1-773, 1-774, 1-775, 1-776, 1-777, 1-778, 1-779, 1-780, 1-781, 1-782, 1-783, 1-784, 1-785, 1-786, 1-787, 1-788, 1-789, 1-790, 1-791, 1-792, 1-793, 1-794, 1-795, 1-796, 1-797, 1-798, 1-799, 1-800, 1-801, 1-802, 1-803, 1-804, 1-805, 1-806, 1-807, 1-808, 1-809, 1-810, 1-811, 1-812, 1-813, 1-814, 1-815, 1-816, 1-817, 1-818, 1-819, 1-820, 1-821, 1-822, 1-823, 1-824, 1-825, 1-826, 1-827, 1-828, 1-829, 1-830, 1-831, 1-832, 1-833, 1-834, 1-835, 1-836, 1-837, 1-838, 1-839, 1-840, 1-841, 1-842, 1-843, 1-844, 1-845, 1-846, 1-847, 1-848, 1-849, 1-850, 1-851, 1-852, 1-853, 1-854, 1-855, 1-856, 1-857, 1-858, 1-859, 1-860, 1-861, 1-862, 1-863, 1-864, 1-865, 1-866, 1-867, 1-868, 1-869, 1-870, 1-871, 1-872, 1-873, 1-874, 1-875, 1-876, 1-877, 1-878, 1-879, 1-880, 1-881, 1-882, 1-883, 1-884, 1-885, 1-886, 1-887, 1-888, 1-889, 1-890, 1-891, 1-892, 1-893, 1-894, 1-895, 1-896, 1-897, 1-898, 1-899, 1-900, 1-901, 1-902, 1-903, 1-904, 1-905, 1-906, 1-907, 1-908, 1-909, 1-910, 1-911, 1-912, 1-913, 1-914, 1-915, 1-916, 1-917, 1-918, 1-919, 1-920, 1-921, 1-922, 1-923, 1-924, 1-925, 1-926, 1-927, 1-928, 1-929, 1-930, 1-931, 1-932, 1-933, 1-934, 1-935, 1-936, 1-937, 1-938, 1-939, 1-940, 1-941, 1-942, 1-943, 1-944, 1-945, 1-946, 1-947, 1-948, 1-949, 1-950, 1-951, 1-952, 1-953, 1-954, 1-955, 1-956, 1-957, 1-958, 1-959, 1-960, 1-961, 1-962, 1-963, 1-964, 1-965, 1-966, 1-967, 1-968, 1-969, 1-970, 1-971, 1-972, 1-973, 1-974, 1-975, 1-976, 1-977, 1-978, 1-979, 1-980, 1-981, 1-982, 1-983, 1-984, 1-985, 1-986, 1-987, 1-988, 1-989, 1-990, 1-991, 1-992, 1-993, 1-994, 1-995, 1-996, 1-997, 1-998, 1-999, 1-1000.

*The major in Drawing and Painting.*—Prerequisite: The Arts and Letters curriculum in the Junior College, or the equivalent, including Art 11-12 and six hours selected from Art 45-46, 47-48, 49-50, 51-52, 53-54, 55-56, 57-58, 59-60, 61-62, 63-64, 65-66, 67-68, 69-70, 71-72, 73-74, 75-76, 77-78, 79-80, 81-82, 83-84, 85-86, 87-88, 89-90, 91-92, 93-94, 95-96, 97-98, 99-100, 101-102, 103-104, 105-106, 107-108, 109-110, 111-112, 113-114, 115-116, 117-118, 119-120, 121-122, 123-124, 125-126, 127-128, 129-130, 131-132, 133-134, 135-136, 137-138, 139-140, 141-142, 143-144, 145-146, 147-148, 149-150, 151-152, 153-154, 155-156, 157-158, 159-160, 161-162, 163-164, 165-166, 167-168, 169-170, 171-172, 173-174, 175-176, 177-178, 179-180, 181-182, 183-184, 185-186, 187-188, 189-190, 191-192, 193-194, 195-196, 197-198, 199-200, 201-202, 203-204, 205-206, 207-208, 209-210, 211-212, 213-214, 215-216, 217-218, 219-220, 221-222, 223-224, 225-226, 227-228, 229-230, 231-232, 233-234, 235-236, 237-238, 239-240, 241-242, 243-244, 245-246, 247-248, 249-250, 251-252, 253-254, 255-256, 257-258, 259-260, 261-262, 263-264, 265-266, 267-268, 269-270, 271-272, 273-274, 275-276, 277-278, 279-280, 281-282, 283-284, 285-286, 287-288, 289-290, 291-292, 293-294, 295-296, 297-298, 299-300, 301-302, 303-304, 305-306, 307-308, 309-310, 311-312, 313-314, 315-316, 317-318, 319-320, 321-322, 323-324, 325-326, 327-328, 329-330, 331-332, 333-334, 335-336, 337-338, 339-340, 341-342, 343-344, 345-346, 347-348, 349-350, 351-352, 353-354, 355-356, 357-358, 359-360, 361-362, 363-364, 365-366, 367-368, 369-370, 371-372, 373-374, 375-376, 377-378, 379-380, 381-382, 383-384, 385-386, 387-388, 389-390, 391-392, 393-394, 395-396, 397-398, 399-400, 401-402, 403-404, 405-406, 407-408, 409-410, 411-412, 413-414, 415-416, 417-418, 419-420, 421-422, 423-424, 425-426, 427-428, 429-430, 431-432, 433-434, 435-436, 437-438, 439-440, 441-442, 443-444, 445-446, 447-448, 449-450, 451-452, 453-454, 455-456, 457-458, 459-460, 461-462, 463-464, 465-466, 467-468, 469-470, 471-472, 473-474, 475-476, 477-478, 479-480, 481-482, 483-484, 485-486, 487-488, 489-490, 491-492, 493-494, 495-496, 497-498, 499-500, 501-502, 503-504, 505-506, 507-508, 509-510, 511-512, 513-514, 515-516, 517-518, 519-520, 521-522, 523-524, 525-526, 527-528, 529-530, 531-532, 533-534, 535-536, 537-538, 539-540, 541-542, 543-544, 545-546, 547-548, 549-550, 551-552, 553-554, 555-556, 557-558, 559-560, 561-562, 563-564, 565-566, 567-568, 569-570, 571-572, 573-574, 575-576, 577-578, 579-580, 581-582, 583-584, 585-586, 587-588, 589-590, 591-592, 593-594, 595-596, 597-598, 599-600, 601-602, 603-604, 605-606, 607-608, 609-610, 611-612, 613-614, 615-616, 617-618, 619-620, 621-622, 623-624, 625-626, 627-628, 629-630, 631-632, 633-634, 635-636, 637-638, 639-640, 641-642, 643-644, 645-646, 647-648, 649-650, 651-652, 653-654, 655-656, 657-658, 659-660, 661-662, 663-664, 665-666, 667-668, 669-670, 671-672, 673-674, 675-676, 677-678, 679-680, 681-682, 683-684, 685-686, 687-688, 689-690, 691-692, 693-694, 695-696, 697-698, 699-700, 701-702, 703-704, 705-706, 707-708, 709-710, 711-712, 713-714, 715-716, 717-718, 719-720, 721-722, 723-724, 725-726, 727-728, 729-730, 731-732, 733-734, 735-736, 737-738, 739-740, 741-742, 743-744, 745-746, 747-748, 749-750, 751-752, 753-754, 755-756, 757-758, 759-760, 761-762, 763-764, 765-766, 767-768, 769-770, 771-772, 773-774, 775-776, 777-778, 779-780, 781-782, 783-784, 785-786, 787-788, 789-790, 791-792, 793-794, 795-796, 797-798, 799-800, 801-802, 803-804, 805-806, 807-808, 809-810, 811-812, 813-814, 815-816, 817-818, 819-820, 821-822, 823-824, 825-826, 827-828, 829-830, 831-832, 833-834, 835-836, 837-838, 839-840, 841-842, 843-844, 845-846, 847-848, 849-850, 851-852, 853-854, 855-856, 857-858, 859-860, 861-862, 863-864, 865-866, 867-868, 869-870, 871-872, 873-874, 875-876, 877-878, 879-880, 881-882, 883-884, 885-886, 887-888, 889-890, 891-892, 893-894, 895-896, 897-898, 899-900, 901-902, 903-904, 905-906, 907-908, 909-910, 911-912, 913-914, 915-916, 917-918, 919-920, 921-922, 923-924, 925-926, 927-928, 929-930, 931-932, 933-934, 935-936, 937-938, 939-940, 941-942, 943-944, 945-946, 947-948, 949-950, 951-952, 953-954, 955-956, 957-958, 959-960, 961-962, 963-964, 965-966, 967-968, 969-970, 971-972, 973-974, 975-976, 977-978, 979-980, 981-982, 983-984, 985-986, 987-988, 989-990, 991-992, 993-994, 995-996, 997-998, 999-1000.

*The major in Sculpture.*—Prerequisite: The Arts and Letters curriculum in the Junior College, or the equivalent, including Art 11-12 and six hours selected from Art 45-46, 47-48, 49-50, 51-52, 53-54, 55-56, 57-58, 59-60, 61-62, 63-64, 65-66, 67-68, 69-70, 71-72, 73-74, 75-76, 77-78, 79-80, 81-82, 83-84, 85-86, 87-88, 89-90, 91-92, 93-94, 95-96, 97-98, 99-100, 101-102, 103-104, 105-106, 107-108, 109-110, 111-112, 113-114, 115-116, 117-118, 119-120, 121-122, 123-124, 125-126, 127-128, 129-130, 131-132, 133-134, 135-136, 137-138, 139-140, 141-142, 143-144, 145-146, 147-148, 149-150, 151-15

- 65-66 *Drawing and Painting I—Life, Still Life, and Portrait* (3-3) The Staff  
Academic year—morning and afternoon
- 67-68 *Drawing and Painting I—Life and Portrait* Archer  
(6-6)  
Academic year—morning, afternoon, and evening
- 71-72 *Introduction to the Arts in America* (3-3) Kline  
Academic year—morning and evening; summer 1957  
Painting, sculpture, architecture, furniture, and the popular arts from the colonial beginnings to the present
- 81-82 *Sculpture I* (6-6) Warneke  
Academic year—afternoon and evening  
Modeling and composition in clay
- 83-84 *Fundamentals of Commercial Art* (3-3) Walton  
Academic year—afternoon  
Introduction to the techniques and media of commercial art.

## SECOND GROUP

- 101 *Ancient Art* (3) Kline  
Fall—afternoon  
The development of the forms of architecture, sculpture, painting, and the minor art in the Ancient Civilizations of Egypt, Mesopotamia, Greece, and Rome.
- 102 *Medieval Art* (3) Kline  
Spring—afternoon  
A study of the architecture, sculpture, and painting from the formative stages of Christian Art in the Byzantine Age through the Romanesque and Gothic periods.
- 103 *Renaissance Art in Italy* (3) Leite  
Fall—morning  
The development of painting, sculpture, and architecture in 15th and 16th century Italy.



- 126 *Renaissance Art in the North* (3) Leite  
 Spring—afternoon.  
 A study of the painting, graphic arts, and major architectural developments in England, France, the Netherlands, Germany, and Spain during the 16th, 17th, and 18th centuries.
- 128 *Baroque Art in Italy* (3) Leite  
 Summer 1957.  
 The development of painting, sculpture, and architecture in the 16th and 17th centuries in Italy.
- 109 *Nineteenth Century Art in Europe* (3) Leite  
 Fall—afternoon.  
 The development of European painting and sculpture from Neoclassicism and Romanticism through Impressionism.
- 110 *Contemporary Art* (3) Leite  
 Spring—afternoon.  
 A study of sculpture and painting from Post Impressionism through the later modern movements to the present.
- 125-26 *Drawing and Painting II—Life, Still Life, and Portrait* (6-6) Sackman  
 Academic year—morning and afternoon.
- 127-28 *Drawing and Painting II—Life and Portrait* Archer  
 (6-6)  
 Academic year—morning, afternoon, and evening.
- 135-36 *Drawing and Painting II—Life and Portrait* Archer  
 (6-6)  
 Academic year—morning, afternoon, and evening.
- 141 *Interior Decoration* (3) Kline  
 1958-59 and alternate years.  
 A study of the principles of decoration dealing with furniture design and ensemble layout, draperies, color, accessories, and lighting.
- 142 *House Planning* (3) Kline  
 1958-59 and alternate years.  
 Study of the contemporary house for family living, including site

problems, the case plan, materials of building, and climate conditioning.

143 *Primitive Art* (3) Kline

Fall—afternoon.

The arts of prehistoric and primitive man in the pre-Columbian Americas, Oceania, and Africa.

146 *Art of the Far East* (3) Kline

Spring—afternoon.

The architecture, painting, and sculpture of China and Japan.

161-62 *Theory and Criticism* (3-4) Evans

Academic year—evening.

The relation of art and the history of art criticism.

165-66 *Drawing and Painting II—Life and Portrait* (6-6) Lahey, Lewis

Academic year—morning, afternoon, and evening.

175-76 *Drawing and Painting II—Life and Portrait* (6-6) Lewis

Academic year—afternoon.

179-80 *Sculpture II* (6-6) Warneke

Academic year—afternoon and evening.

Portrait life modeling and composition in clay, plaster and wood carving.

181-82 *Design and Commercial Art* (3-3) The Staff

Academic year—afternoon.

183-84 *Commercial Art* (6-6) Walton

Academic year—afternoon and evening.

Perspective drawing, coloring, drawing of furniture, merchandise, and fashion; lettering and typography; layout; rendering techniques; production methods.

185-86 *Advanced Commercial Art* (6-6) Walton

Academic year—afternoon and evening.

Layout and illustrative problems in advertising campaigns; reproduction methods in black and white, half-tone printing, and color; work methods.

## BACTERIOLOGY, HYGIENE, AND PREVENTIVE MEDICINE

- Leland Walter Parr, Ph.D., *Professor of Bacteriology, Executive Officer*  
 Angus MacIvor Griffin, Ph.D., *Professor of Bacteriology*  
 Ralph Gregory Bentley, M.D., Dr.P.H., *Associate Professor of Public Health Practice*  
 Mary Louise Robbins, Ph.D., *Associate Professor of Bacteriology*  
 William Gray Morrison, M.S., *Assistant Professor of Bacteriology*  
 Rudolph Huie, Ph.D., *Assistant Professor of Bacteriology*  
 Charles Francis McCaffrey, M.D., *Clinical Instructor in Preventive Medicine and Public Health*  
 William Donald Hann, M.S., *Associate in Bacteriology*

### SPECIAL LECTURERS

- Chester Wilson Emmons, Ph.D., *Chief, Medical Mycology Unit, Laboratory of Infectious Diseases, National Microbiological Institute, National Institutes of Health, Medical Mycology*  
 Willard Hall Wright, D.V.M., Ph.D., *Chief, Laboratory of Tropical Diseases, National Microbiological Institute, National Institutes of Health, Medical Zoology*  
 John Roderick Heller, Jr., B.S., M.D., *Director, National Cancer Institute, National Institutes of Health, Cancer Control*  
 Robert Carter Cook, *Director, Population Reference Bureau; Editor, Journal of Heredity, Medical Genetics*  
 Robert Hanna Felix, M.D., M.P.H., *Director, National Institute of Mental Health, National Institutes of Health, Mental Hygiene*  
 Francis Byron Gordon, Ph.D., M.D., *Head, Tropical Diseases, Naval Medical Research Institute, Naval Medical Center, Virology*  
 Edward Kramer Finkbeiner, B.S., *Executive Secretary, District of Columbia Tuberculosis Association; Community Health Resources*  
 Samuel Jacob Ayl, Ph.D., *Assistant Chief, Department of Bacteriology, Communicable Diseases Division, Walter Reed Army Institute of Research, Walter Reed Army Medical Center; Microbiological Chemistry*  
 Sarah B. Leo Brooks, R.N., B.S. in P.H.N., *Director, Division of Public Health Nursing, Arlington County Health Department; Public Health Practice*  
 Martin Marc Cummings, B.S., M.D., *Chief, Research and Education Service, Department of Medicine and Surgery, Veterans Administration, Medical Bacteriology*



Morris Cecil Leikind, M.S., *Chief, Historical Research Division, Medical Museum, Armed Forces Institute of Pathology; History of Microbiology*

*Master of Arts or Master of Science in the field of Bacteriology (Columbia College)*—Prerequisite: a Bachelor of Arts or a Bachelor of Science degree, respectively, from this University, or the equivalent, with a major in Biology, Botany, Chemistry, or Zoology. The undergraduate program must include the following courses or the equivalent: Chemistry 11-12, 21, 151-52; Physics 6, 7; Zoology 1-2, 41-42.

*Required:* the general requirements as stated on pages 87-91. The thirty-master hours must include Bacteriology 209, 210, 201-24, 205-06, 209-10. The remaining master hours are to be selected from Bacteriology 412-25, 216, 214, 214-25, and Biochemistry 201-22 (if not presented for admission). The student will need a technical background and may substitute for master hours courses from the following: cytology, genetics, cell physiology, cytogenetics, histology, immunology, and physiology. It is not always possible to arrange master and research so that the student can be assured of completing all required work in one academic year.

*Doctor of Philosophy—Graduate Council.—See page 91.*

#### 112 *General Bacteriology* (4)

Hugh

Spring—Mon., Wed., and Fri., 9:15 to 12:30 A.M.

For nonmedical students. A study of the fundamentals of bacteriology, including taxonomic applications. Methods of separation and purification of several groups of microorganisms are studied in the laboratory. Prerequisite: any biological laboratory science. Chemistry 11-12. Laboratory fee, \$15.

#### 209 *Medical Microbiology* (1-11)

Parr, Griffin

Fall: lecture (4 hours), laboratory (16 hours)—41 semester hours.

Bacteria, rickettsia, viruses, yeasts, molds, protozoa, and parasites which relate to the health and diseases of man—critical study of most important forms, methods of diagnosis by microscopy, culture, immunologic, and animal reactions, theory and methods of treatment—typhoid, scarlet, diphtheria. Open to military students; graduate students may be elected as a whole or in part by taking the appropriate letter to the course number, with credit allocated as follows: 1-11 Bacteriology, including rickettsia and immunology (4); laboratory (31); 1-11 Parasitology, including medical entomology (12); laboratory (11); 1-11 Immunology (4). May be taken by a limited number of students for Master's degree. Laboratory fee, \$4.00 and summer hour of laboratory work.

#### 210 *Fundamentals of Epidemiology and Public Health* (2)

Parr and Staff

Spring—Mon., 2:00 to 4:00 P.M.

Source, mode, and distribution of infection and injury. Consider the role of the community of individuals and individual actions. Open to liberal arts students and students. Prerequisite: Bacteriology 112 or 209.



- 219-20 *Advanced Microbiology* (arr.) Hugh and Staff  
Academic year—as arranged.  
Special study of advanced methods and current problems in microbiology for suitably qualified students specializing in microbiology. Prerequisite: Bacteriology 112 or 207. Chemistry 131-32 or the equivalent, permission of the instructor. Laboratory fee, \$4.50 a semester hour.
- 230 *Statistics in Microbiology* (3) Griffin  
Spring—as arranged.  
The application of statistical methods to the problems of microbiology. For liberal arts graduate students. Prerequisite: entrance or elementary college algebra.
- 232 *Immunological Methods* (3) McCarten  
1958-59 and alternate years.  
Preparation and testing of serological materials. Demonstration of basic serological phenomena. For liberal arts graduate students. Prerequisite: Bacteriology 112 or 207 and permission of the instructor. Laboratory fee, \$11.
- 234 *Virology* (6) Rebbins  
Spring—as arranged.  
Study of viruses and rickettsiae. Lectures and laboratory exercises. For liberal arts graduate students. Prerequisite: Bacteriology 112 or 207 and permission of the instructor. Laboratory fee, \$11.
- 240 *Advanced Epidemiology and Public Health* (3) Parr  
Spring—as arranged.  
Controversies, readings, and problems for graduate students dealing with microbial and advanced phases of the topics presented in Bacteriology 112. Prerequisite: Bacteriology 112.
- 243-54 *Staff Seminar* (1-1) The Staff  
Academic year—as arranged.  
For liberal arts graduate students. Bi-weekly throughout the year.
- 245-46 *Research in Bacteriology* (arr.) The Staff  
Academic year—as arranged.
- 247-50 *Thesis* (3-3) The Staff

340 *Health Resources Survey*

Beachley and Staff

Spring—1 hour a week for 3 weeks; summer 1957—Independent study.

A survey of complete medical care from first contact, through laboratory and clinical diagnosis, treatment, and follow-up treatment to the family and community relationship. Case histories assigned junior students with the cooperation and assistance of the clinical department. Comparison is to be made between public and private facilities and care in facilities where the student might have had previous experience. Emphasis is on comparison of the private, community, and community public health and welfare activities, both tax supported and voluntary. Throughout the historic point of view is assumed.

401 *Public Health Practice*

Beachley and Staff

Fall—1 hour a week for 5 weeks.

Study of public health practice at national, state, city, and county levels. Public and private agencies.

## BIOCHEMISTRY

Joseph Hiram Row, Ph.D., *Professor of Biochemistry, Executive Officer*  
 Carleton Raymond Treadwell, Ph.D., *Professor of Biochemistry*  
 Bernard Leonard Horecker, Ph.D., *Professorial Lecturer on Enzymes*  
 William Robert Carroll, Ph.D., *Professorial Lecturer on Proteins*  
 Charles Hunt Fugitt, Ph.D., *Professorial Lecturer on Physical Biochemistry*  
 Benjamin Williams Smith, Ph.D., *Associate Professor of Biochemistry*  
 George Vartkes Vahouny, M.S., *Instructor in Biochemistry*  
 Archie Lee Smith, M.S., *Instructor in Biochemistry*  
 Harold William Clark, Jr., Ph.D., *Associate in Biochemistry*

*Master of Arts or Master of Science in the field of Biochemistry (Columbia College).—Prerequisite: a Bachelor of Arts or a Bachelor of Science degree. The following courses must have included the following credits as the minimum: Chemistry 11-12, 21, 22, 151 and 152; Physics 1 and 2; Zoology 1-2 or Botany 1-2.*

*Students for special programs in research or honor thesis. The study requires four semesters (years). The minimum credits are: 125-126, 205-206, 207-208. The minimum credits are to be earned (year). Biochemistry 103, 104, 209, 210, 211-212, and with the approval of the college, four graduate courses in Biochemistry, Chemistry, Physiology, or Pharmacology. It is possible for students to complete research and research so that the student can be granted a completion of the required work in one academic year.*

*Degree in Philosophy (Graduate Council)—See program.*

### 113-14 *Biochemistry* (100 and 100.5)

*Students: year: Lecture (2 hours), Laboratory (1 hour), Minimum 10 credit hours required.*

*Physiological and clinical chemistry. For medical students.*

### 221-22 *Biochemistry* (4-4) Treadwell

*Students: year: Lecture and Thesis, year to 12:00 A.M. and 1:00 to 2:00 P.M.*

*A lecture and laboratory course for nonmedical students. Prerequisite: Chemistry 21 and 151. Material for 213 is covered.*

### 224 *Biochemistry of the Enzymes* (1) Horecker

*Students: Min. 5 in P.M.*

*Lecture course dealing with the biochemistry of the enzymes and enzyme reactions. Prerequisite: Biochemistry 113 or 211.*

- 225-26 *Biochemical Procedures* (3-3) B. Smith and Staß  
Academic year—as arranged.  
A laboratory course. Material fee, \$16 a semester.
- 227-28 *Biochemistry Seminar* (1-1) Roe  
Academic year—Fri., 4:00 P.M.  
The current literature in the field of biochemistry, mainly for graduate students, but open to a limited number of specially qualified medical students.
- 232 *Proteins and Amino Acids* (1) Carroll  
Spring—Wed., 5:00 P.M.  
A lecture course. Prerequisite: Biochemistry 113 or 221.
- 234 *Physical Biochemistry* (1) Fugitt  
Spring—Sat., 9:00 A.M.  
A lecture course. Physical methods as applied to biochemical problems, including macromolecules and radioactivity. Prerequisite: Biochemistry 113 or 221.
- 251 *Carbohydrate Metabolism* (1) Roe  
1958-59 and alternate years.  
A lecture course. Prerequisite: Biochemistry 114 or 222.
- 261 *Biochemistry of the Lipids* (1) Treadwell  
1957-58 and alternate years—Fall—Sat., 9:00 A.M.  
A lecture course. Prerequisite: Biochemistry 114 or 222.
- 295-96 *Research in Biochemistry* (arr.) Roe, Treadwell  
Academic year—as arranged.
- 297-300 *Thesis* (3-3) Roe, Treadwell



## BIOLOGY\*

Paul William Bowman, Ph.D., *Professor of Biology, Executive Officer*  
 Robert Carter Cook, *Professorial Lecturer on Genetics*  
 Sam Clark Munson, Ph.D., *Associate Professor of Biology*

*Bachelor of Arts or Bachelor of Science with a major in Biology (Columbia College Field of Study).—*Prerequisites: the Arts and Letters or the Science courses, respectively, in the Junior College, see pages 66 and 67.

*Required.* The general requirements as stated on pages 80-86 and the grade of "pass" on the Biology major examination at the end of the senior year. The organized body of knowledge upon which the student will be examined includes the classification and life histories of plants and animals, energy, growth, nutrition, heredity, the physical and cultural development of man, public health problems, and the history of biology. The course offerings will be modified and supplemented by selected study in a department. For further details, see the pamphlet, which is available at the Office of the Dean of Columbia College.

*Master of Arts or Master of Science in the field of Biology (Columbia College).—*Prerequisites: a Bachelor of Arts or Bachelor of Science degree, respectively, with a major in Biology at this University, or the equivalent.

*Required.* The same requirements as stated on pages 90-91.  
*Bachelor of Arts or Bachelor of Science with a teaching field in Biology (School of Education).—*Prerequisites: the Education curriculum, page 66.

*Required.* the Biology option, page 103, and the professional courses listed on pages 169-75.

*Doctor of Philosophy (Graduate Council).—*See page 95.

### FIRST GROUP

#### 1-2 Survey in Biology (3-3) Munson and Staff

Academic year—morning, afternoon, and evening; summer 1957.

Systematic study of the plant and animal kingdoms, with emphasis upon the interdependence of living things and their relations with their environments. Introduction to evolution, heredity, public health, and conservation. Material fee, \$7 a semester. Lectures, laboratory, and field trip to nearby countryside, museums. And other points of biological interest.

### SECOND GROUP

#### 107-8 Organic Evolution (3-3) BOWMAN

1957-58 and alternate years. Academic year—morning, 1958-59 and alternate years. Academic year—morning.

A study of the theories of organic evolution and present ideas on the principal lines of development in the plant and animal kingdoms.

\* See also departments of Botany and Zoology.

a review of the contributions to an understanding of the mechanisms involved in this process from the fields of genetics and cytology. Prerequisite: one year of college work in biology, botany, or zoology.

115-16 *Cytology* (3-3)

Bowman

Lecture, recitation, and laboratory. 1957-58 and alternate years: academic year—morning; 1958-59 and alternate years: academic year—evening.

Plant and animal cells and their components, including the chromosomes and their role in heredity, with emphasis on the interpretation of results for study. Prerequisite: one year of college work in biology, botany, or zoology. Material fee, \$8 a semester.

127 *Genetics* (3)

Cook

Not offered 1957-58.

A lecture course in which the general principles are illustrated with specific examples of inheritance in plants and animals, including man. Prerequisite: one year of college work in biology, botany, or zoology.

139 *Cell Physiology* (3)

Not offered 1957-58.

The fundamental physiology of prokaryotes. Prerequisite: Chemistry 12 and one year of college biology, botany, or zoology.

199-200 *Practicum in Biology* (3-3)

Bowman

Alternate years—morning.

Investigative, practical and research study by teams of about eight in biology with correlation and complement of student projects presented in various regular courses.

## THIRD GROUP

201-2 *Seminar: Cytology* (3-3)

Bowman

Academic year—evening.

211-12 *Research in Cytology* (1-1)

Bowman

Academic year—alternate years: 1957—Biology 211; 1958—

299-300 *Thesis* (3-3)

Bowman

Academic year—as arranged; summer 1957.

## BOTANY\*

Lyman Bradford Smith, Ph.D., *Professorial Lecturer in Taxonomy*

Joan Gilbert Palmer, Ph.D., *Assistant Professor of Botany, Executive Officer*

Assistant Professor of Botany

*Bachelor of Arts in Bachelor of Science with a major in Botany (Columbia College, Department).—Prerequisites: the Arts and Letters or the Science curriculum, respectively, in the Junior College, see pages 44 and 45.*

*Required: in addition to the usual requirements as stated on page 45, a minimum of twenty-four semester hours in Botany beyond the introductory course, with culminating as prescribed in curriculum.*

*Master of Arts or Master of Science in the Field of Botany (Columbia College).—Prerequisite: the equivalent of a Bachelor of Arts or Bachelor of Science degree, respectively, from this University with a major in Botany.*

*Required: the usual requirements as stated on page 45.*

*Doctor of Philosophy (Graduate Course).—200 years '45.*

### FIRST GROUP

- |   |                  |
|---|------------------|
| 1 <i>Structure and Functions of the Flowering Plant</i> † (3) | Palmer and Staff |
|---|------------------|

Lecture (2 hours), laboratory (2 hours)

February 2, afternoon, and evening, spring; lecture—morning, late history—afternoon, summer 1947.

The typical plant as a working mechanism, with the emphasis on biology as fundamental of plant physiology. Abstracts, 87.

- |  |                  |
|--|------------------|
| 2 <i>Survey of the Plant Kingdom</i> ‡ (3) | Palmer and Staff |
|--|------------------|

Spring, summer (2 hours), laboratory (2 hours)—morning, afternoon, and evening, summer 1947.

Study of the different kinds of plants, with emphasis on the evolution of the plant kingdom; practice in identifying flowering plants. Abstracts, 87.

### SECOND GROUP

- |                             |        |
|-----------------------------|--------|
| 105 <i>Field Botany</i> (3) | Palmer |
|-----------------------------|--------|

Not offered 1947-48.

Field trips to neighboring localities of botanical interest, with classroom study. Prerequisite: Botany I and 2 or Biology I. Lecture (1 hour); laboratory (2 hours); field trips (3 hours).

\* See also the Department of Botany, Zoology, and Zoology.  
 † Large introductory population, each student must obtain from the representative of the Department an assignment to a laboratory section.  
 ‡ Large introductory population, each student must obtain from the representative of the Department an assignment to a laboratory section.



107 *Algae, Fungi, and Mosses* (3)

Not offered 1957-58.

Field and laboratory study of the habitat, structure, and classification of representative local forms of algae, fungi, and mosses. Prerequisite: Botany 1 and 2 or Biology 1-2.

109 *Plant Morphology* (3)

Palmer

Not offered 1957-58.

Survey of structure of root, stem, leaf, and flower of seed plants; followed by the application to several of the economically important groups. Prerequisite: Botany 1 and 2 or Biology 1-2. Lecture (2 hours); laboratory (2 hours).

110 *Plant Growth* (3)

Spring—evening

The functioning of plants with special emphasis on the practical problems of growing and of caring for plants. Prerequisite: Botany 1 or Biology 1. Lecture (2 hours); laboratory (2 hours).

118 *Physiology of Bacteria and Fungi* (3)

1957-58 and alternate years, fall—evening

Lectures, literature reviews, and laboratory studies of the physiology of bacteria and fungi. Prerequisite: Botany 1 and 2 or Biology 1-2.

125-26 *Plant Taxonomy* (1-3)

Palmer

Autumn, year-evening

A study of the characteristics, phylogeny, and economics of selected families of the flowering plants. Field collection and identification. Prerequisite: Botany 1 and 2 or Biology 1-2. Material fee, \$7 a semester. Lecture (1 hour); laboratory and field (4 hours).

131-32 *Mycology* (3-3)

Palmer

Not offered 1957-58.

133-34 *Plant Pathology* (3-3)

Palmer

Autumn, year-evening

Material fee, \$6 a semester.

135-36 *Plant Physiology* (3-3)

Not offered 1957-58.

First half, general and basic relations of plants, second half, specific systems and growth. Prerequisite: Chemistry 10-12. Material fee, \$6 a semester.



141-42 *Plant Ecology* (3-3)

Not offered 1957-58.

143 *Introduction to Plant Geography* (3)

Not offered 1957-58.

A study of the basic principles and methods of plant geography. Prerequisite: Botany 1 and 2 or Botany 1-2.

144 *The Vegetation of North America* (3)

Not offered 1957-58.

Lectures, seminars, and laboratory on the characteristic vegetation of North America with emphasis on the United States. Prerequisite: Botany 1 and 2 or Botany 1-2.

161 *Soils* (3)

Not offered 1957-58.

Composition, characteristics, geographic distribution, and uses of soils. (For students interested in plant distribution, ecology, and soils: Geography 118, *Ecologic Geography*; Agriculture 111, *Evolution of Natural Resources*; and 131, *Land Use* are recommended as courses.)

## THIRD GROUP

221-22 *Seminar: Taxonomy* (3-3)

Smith

Not offered 1957-58.

235-36 *Seminar: Physiology* (3-3)

Not offered 1957-58.

241-42 *Seminar: Ecology* (3-3)

Not offered 1957-58.

295-96 *Research* (att.)

The Staff

Academic year—41 (attested); summer 1957—Botany 295 (att.). For to be attested.

297-97 *Thesis* (3-3)

The Staff

Academic year—41 (attested); summer 1957.

## BUSINESS AND PUBLIC ADMINISTRATION

- Richard Norman Owens, Ph.D., C.P.A., *Professor of Business Administration*  
Harold Griffith Sutton, M.S., *Professor of Finance*  
Arlin Rex Johnson, Ph.D., *Professor of Business Administration*  
Joe Lee Jessup, M.B.A., *Professor of Business Administration*  
James Carlton Dockeray, Ph.D., *Professor of Finance, Executive Officer*  
David Springer Brown, Ph.D., *Professor of Public Administration*  
Montrell Ernest Ogdon, Ph.D., *Professorial Lecturer in Business Administration*  
Karl Ernest Stromsem, Ph.D., *Professorial Lecturer in Public Administration*  
Joseph Leo Krueger, Ph.D., *Professorial Lecturer in Business Administration*  
Carl William Clewlow, A.M., *Professorial Lecturer in Business Administration*  
Eugene Dudley Fields, B.S., C.P.C.U., *Professorial Lecturer on Insurance*  
William George Torpey, Ph.D., *Professorial Lecturer in Public Administration*  
Reuben Horthow, M.B.A., LL.B., *Professorial Lecturer in Business Administration*  
Joseph Novak Stonesiter, A.M., *Professorial Lecturer in Business Administration*  
Joseph Patrick Murphy, A.B., LL.B., LL.M., *Associate Professorial Lecturer on Commercial Law*  
William Williams Edwards, A.M., *Associate Professorial Lecturer in Business Administration*  
Roy Brandon Eastin, Ph.D., *Associate Professorial Lecturer in Public Administration*  
Irvine Samuel Schwartz, A.M., *Associate Professorial Lecturer in Public Administration*  
Alfred Gaylord Obern, Ph.D., *Assistant Professor of Public Administration*  
Robert Kaye, A.M., *Lecturer in Business Administration*  
Len Theodore Hugberg, A.M., *Lecturer in Public Administration*  
John Provan, M.S., *Lecturer in Public Administration*  
Lewis Miller Nixon, Ph.D., *Lecturer in Public Administration*  
Robert John Reed, A.B., *Lecturer in Business Administration*  
Frederick William Walther, M.B.A., *Lecturer in Business Administration*

Frederick Timberlake, M.B.A., *Instructor in Business Administration*  
 Robert Fenn Towson, Jr., M.B.A., *Instructor in Business Administration*

*Bachelor of Arts in Government with a major in Business Administration (School of Government).—For schedule see page 70, 1947-48.*

*Master of Business Administration (School of Government).—Prerequisite: acceptable undergraduate major in Business Administration or the equivalent. Required: the master's thesis. For the degree as stated see page 71.*

*Master of Arts in Public Administration (School of Government).—For schedule see page 71.*

*Master of Arts in Personnel Administration (School of Government).—For schedule see page 71.*

*Doctor of Business Administration (School of Government).—Prerequisite: a Master's degree in Business Administration or a related field, or the equivalent, and proficiency in STATISTICS and ACCOUNTING to the satisfaction of the Committee on Doctoral Studies.*

*Required: thirty hours of graduate work beyond the Master's level, the passing of a general examination in three fields, and the writing and defending of a dissertation. See page 72-73.*

*Bachelor of Arts in Education with teaching fields in Business Education (School of Education).—Prerequisite: the Education program, page 42.*

*Required: the Business Education courses, pages 104-5, and the professional courses listed on pages 159-70.*

## BUSINESS ADMINISTRATION

### SECOND GROUP

- 101 *Business Organization and Combination* (3) Timberlake  
 Fall—morning and evening; spring—evening; summer 1947

Simple and interrelated forms of business enterprise and their control by government.

- 102 *Business Management* (3) Timberlake, Towson  
 Fall—morning; winter—morning and evening; summer 1947

The management movement, organization of an enterprise, production of management, and their application to various requirements of an enterprise.

- 105 *Personnel Management in Industry* (3) Owen  
 Fall—morning; spring—evening; summer 1947

Organization and work of the personnel department, human relations in business.

- 106 *Problems in Personnel Management* (3) Stansfield  
 Fall—evening; spring—morning

Principles of human relations illustrated by cases drawn from business and industry. Prerequisite: Business Administration 101.



- 107 *Management-Labor Contracts* (3) Stonesifer  
Spring—evening  
Design and administration of collective bargaining agreements from the viewpoint of developing good management-labor relations.
- 109 *Office Management* (3) Walther  
Fall—evening, spring—evening, summer 1957  
Organization and layout of an office, use of office machines and appliances, planning and execution of work, supervision problems.
- 113 *Real Estate* (3) Horchow  
Fall—evening  
Fundamentals of real estate practice; listing and property management, valuation, financing, and taxation.
- 116 *Urban Transportation* (3)  
Not offered 1957-58.  
Local transportation in economic development; regulation, finance, operation, and management of transit systems, community planning for streets, highways, parking, and traffic control.
- 121 *General Insurance* (3) Horchow  
Spring—evening  
A general course in underlying principles of property, life, marine, and casualty insurance, and the function of insurance in the economic life of a business or individual. Prerequisite: Economics 1-1.
- 123-24 *Property and Casualty Insurance A and B* (2-2) Fields  
1958-59 and alternate years  
The principles and practice of property and casualty insurance with emphasis on the economics of insurance, types of policies, contract provisions, deductibles and co-insurance, and state regulation and supervision.
- 125-26 *Property and Casualty Insurance C and D* (2-2) Fields  
1957-58 and alternate years; academic year—evening  
The principles and practice of property and casualty insurance with emphasis on theory of probability, rates and ratings, reserves, financial statements, and investments; loss adjustment and loss prevention. Prerequisite: Business Administration 121-21.
- 127-28 *Property and Casualty Insurance E and F* (2-2) Fields  
1957-58 and alternate years; academic year—evening  
Principles of accounting, principles of income and personal finance; business operations and policy management.



129-30 *Property and Casualty Insurance C and H (2-2)* Fields

1958-59 and alternate years.

Insurance law with particular attention given to construction of insurance contracts and general contract law as it relates to contracts. Agency, partnership, corporations, partners (jointly, tenants and partners, limited partnerships, liability), insurance, contracts and private claims, and tortious.

131 *Business Finance (3)* Dockeray, Timberlake

Fall—morning, spring—morning and evening, summer 1957.

Basic principles involved in the financing of business enterprises. Prerequisite: Accounting 1-2.

136 *Commercial Credit (3)*

Not offered 1957-58.

Types and sources of credit information, credit relationships from the standpoint of the commercial bank and the commercial business enterprise. Prerequisite: Accounting 1-2.

138 *Investments (3)*

Dockeray

Spring—morning, summer 1957.

Analysis of factors of investment credit with application to different types of investments, proper selection of investments for various classes of investors, speculation. Prerequisite: Accounting 1-2.

141 *Principles of Marketing (3)*

Towson

Fall—morning; spring—evening, summer 1957.

A survey of marketing, giving particular attention to competition, retailing, wholesaling, and sales management; the selling marketing structure and its relation to the economy. Prerequisite: Introduction 1-2.

142 *Marketing Problems (3)*

Towson

1958-59 and alternate years.

Marketing problems applied to specific distribution policy and operation problems of retail wholesalers and manufacturers handling consumer and industrial goods. Prerequisite: Business Administration 141.

143 *Marketing Research (3)*

Towson

Fall—evening.

Study of market research methods and techniques, sources of data, the use of market research in business decisions.

- 145 *Sales Management* (3) Towson  
 Fall—Evening  
 Organization of the sales department; sales planning and forecasting; quotas, territories, performance standards, cost analysis and control of distribution costs. Prerequisite: Business Administration 141.
- 146 *Sales Management Problems* (3) Jessup  
 Spring—Evening  
 Problems of marketing executives with respect to planning sales programs, territories, and salesman's quotas; selection, training, and supervision of sales force. Prerequisite: Business Administration 145.
- 147 *Advertising* (3) \_\_\_\_\_  
 Fall—Evening  
 Advertising as a function of marketing and merchandising; evaluation, purchase, creation, and control of advertising; uses and limitations of advertising as a tool of management.
- 148 *Wholesaling* (3) \_\_\_\_\_  
 Spring—Evening  
 The wholesale function, organization and types; conduct of wholesale activities.
- 149 *Retail Advertising and Sales Promotion* (3)  
 Not offered 1957-58  
 Operation of the advertising department in a retail store. Use of newspaper, radio, and television advertising by retail stores. Other advertising media, merchandising, and bookkeeping.
- 150 *Principles of Purchasing* (3) \_\_\_\_\_  
 Spring—Evening  
 Organization for purchasing; purchasing policies; market relationships; selection of merchandise; purchasing information and records.
- 151 *Retailing* (3) Bond  
 Fall—Evening  
 Principles and problems in retail merchandising, including markup, inventory valuation, and expense control; service and personnel problems.

- 152 *Supervision and Training of Retail Personnel* (3)  
Not offered 1957-58  
The organization and operation of the personnel department in a retail establishment. Selection, supervision, and training of sales and service personnel.
- 158 *Traffic Management and Warehousing* (3)  
1958-59 and alternate years  
Description and records of traffic department, routing of shipments, subject by various modes and classes, relation of ships to transportation handling problems of various kind inventory management.
- 161 *Commercial Law: Contracts, Sales, Agency, and Bailments* (3) ———, Murphy  
Fall—afternoon and evening
- 162 *Commercial Law: Negotiable Instruments, Property, Mortgages* (3) ———, Murphy  
Spring—afternoon and evening
- 163 *Law in Relation to the Form of Business Units: Corporations, Partnerships, and Trusts* (3) ———, Murphy  
Fall—evening
- 175 *Introduction to Foreign Trade* (3) ———, Kaye  
Fall—evening  
Terminology, trade sources and practices, conditions essential to successful trading, economic bases of international trade, education to trade, tariffs, extent of governmental controls on private trade, prerequisites. Prerequisite: 1-2.
- 176 *Exporting and Importing* (3) ———, Kaye  
1957-58 and alternate years; spring—evening  
Policy and operating questions of foreign trade, financing and documentation of shipments. Prerequisite: Business Administration 175.
- 178 *Foreign Markets* (3)  
1958-59 and alternate years  
Patterns of world trade by countries and commodities, methods of procuring foreign buyers, selected regional market analyses. Prerequisite: Economics 1-2.

- 191 *Business Reports and Analyses* (3) Dockeray  
Not offered 1957-58.  
Research in solving business problems and reports for management use. Open to seniors.
- 193 *Management Communication* (3) \_\_\_\_\_  
Fall—evening.  
A survey course in the problems of communication; written communication style and format; and communication oral language and presentation; group leadership; rapid thinking; completed staff work; and related subjects.
- 195 *Controllershship* (3) Edwards  
Fall—evening.  
The duties, responsibilities, and place of the controller in a business organization; relations of controller to other departments and regulatory bodies; and the controller's position in budget setting and execution; departmental reports; internal auditors; expense control and budgeting; and financial reports to management, stockholders, and creditors. Prerequisite: Accounting 1-2. Open to seniors.
- 197 *Introduction to Business Policy* (3) Jessup  
Fall—morning.  
Significance of business policy to management; formulation of and justification of various organizational levels to policy making; some significant policies, including case problems.
- 198 *Problems in Business Management* (3) Towson, Johnson  
Fall—morning and evening, spring—morning and evening.  
Problems and methods of management illustrated by case studies from business and industry. Prerequisite: Business Administration 102. Open to seniors.

## THIRD GROUP

- 201 *Advanced Management* (3) Owens  
Fall—evening.  
An advanced course in management emphasizing principles of management as related to business performance.
- 209 *Seminar in Personnel Management* (3) \_\_\_\_\_  
Fall—evening.  
Research in selected problems of personnel management.



- 231 *Corporate Financial Problems* (3) Dockeray  
Fall—evening.  
Financial problems in protection, consolidation, and mergers; capital structure adjustments; and reorganizations.
- 232 *Seminar in Business Finance* (3) Dockeray  
Spring—evening, summer 1957.  
Recent in advanced financial problems.
- 237 *Security Analysis* (3) Dockeray  
Fall—evening.  
An advanced course in the applications of investment principles and analytical techniques to the selection of investments. *Prerequisite:* Business Administration 138.
- 238 *Seminar in Investments* (3) \_\_\_\_\_  
Spring—evening.  
Recent in investment problems, techniques of selection and the management of various types of funds. *Prerequisite:* Business Administration 138.
- 241-42 *Seminar in Marketing* (3-3) Johnson  
Academic year—evening.  
An advanced course in marketing, emphasizing special and current problems in the field. (Business Administration 241 is not a prerequisite for Business Administration 242.)
- 251 *Seminar in Retailing* (3)  
Not offered 1957-58.  
An advanced course in retailing giving emphasis to trends in the development of public relations and techniques.
- 268 *Management Engineering* (3) Clewlow  
Fall—evening.  
Analysis of the techniques for selection and implementation of management engineering programs, with emphasis on examination and critical surveys including the study of work measurement, work simplification, management audits, and other management improvement programs.
- 273-74 *Readings in Business* (3-3) The Staff  
Academic year—as arranged.  
Advanced readings in the fields of finance, marketing, and personnel management. Assigned by permission of the instructor.

- 278 *The Dynamics of Business* (3)   
Not offered 1957-58  
An analysis of the structure of American business, including a study of small and great firms in competitive activity and their bearing upon governmental policy.
- 280 *Management in the Armed Forces* (3) Clewlow  
Not offered 1957-58  
Specific problems of military organization and management; application of business management techniques to the armed forces.
- 287 *Relation of Government to Business* (3)   
Not offered 1957-58  
Activities of government in their relation to business management in such areas as labor relations, wages, production, and prices.
- 288 *Executive Leadership* (3) Krieger  
Spring—evening.  
Examination of principles and problems of executive leadership and development; extensive consideration of basic theory and guide to executive action in business and public administration; review of the literature, significant research findings, and practical illustrations.
- 291-92 *Seminar in Business Management* (3-3) Owens  
Academic year—evening; summer 1957—Business Administration 292 (3).  
Research on various phases of management, including business, industrial, and personal management.
- 293-94 *Business Research* (3-3)   
Not offered 1957-58.
- 296 *Seminar in Controllorship* (3) Jessup  
Spring—evening.  
Research on advanced problems of the controller in all types of business administration and the Federal Government.
- 297-98 *Business Policy* (3-3) Jessup  
Academic year—evening.  
Problems of management are analyzed with the view of developing a practical solution; cases are used to show the problems of personnel in marketing, industrial management, finance, etc.
- 299-300 *Thesis* (3-3) Dockeray and Staff  
Academic year—evening; summer 1957.

## COURSES OFFERED IN SPECIAL PROGRAMS

In addition to the regular courses announced above, the University offers the following business administration courses especially for students enrolled in the following special programs: Navy Graduate Comptrollership Program, Air Force Advanced Management Program, and Engineering Administration.

- 235 *Financial Management* (3)
- 250 *Contract Administration* (3)
- 253 *Procurement and Distribution* (3)
- 263-64 *Business Organization and Management* (3-3)
- 269 *Readings and Conferences in Comptrollership* (2)
- 275-76 *Human Relations in Business* (3-3)
- 284 *Readings and Conferences in Management* (2)
- 290 *Research Seminar in Management* (3)
- 295 *Research Seminar in Comptrollership* (3)

## PUBLIC ADMINISTRATION

## THIRD GROUP

- 210 *The Management Function* (3) Eastin  
Spring-evening.  
Principles and processes of management with particular attention to planning of organization, direction and coordination of work, internal communication, and measurement of achievement in government.
- 211 *Problems of Governmental Organization* (3) Obern  
Fall-evening; summer 1957.  
Theories and principles of organization; analysis of problem areas in administration, such as decentralization, staff line, field-headquarters and executive-legislative relationships.
- 212 *Case Studies in Administration* (3) Obern  
Spring-evening; summer 1957.  
Analysis and discussion of problems in public management, approached by the group using primarily the case method.
- 215 *Comparative Administrative Systems* (3) Obern  
Fall-evening.  
Examination and analysis of the administrative systems of the major foreign governments with particular attention to functions applicable to administration in the United States.



216 *Administrative Analysis and Research* (3) Obern

Spring—evening.

Management engineering techniques of organization survey and work analysis. Measurement of administrative effectiveness, application of principles of scientific management.

217 *New Tools of Management* (3) Brown

Fall—evening.

This course provides information for the advanced student on latest developments in new methods of administration, including electronic devices (administrative equipment), scientific theories, and its control, attitude measurement, and social activities. Subjects discussed in great lectures with opportunity for individual discussion and consultation.

221-22 *Staff Functions in Government* (3-3) Obern, Hagberg

Academic year—evening.

Designed primarily to provide an understanding of the nature, use, and relevance of the staff functions in terms of management. Survey of such staff areas as personnel, budgeting, controlling, procurement, property management, the money lawyer, security, public relations and information, planning, research, the consultant, management engineering, auditing, accounting, and administrative services.

225-26 *Internship in the Administrative Processes* (3-3) Obern

Academic year—as arranged.

Fall course is open only to persons selected by government agencies for participation in management trainee programs.

231 *Public Personnel Management* (3) Torpey

Fall—evening.

Basic principles, structure and organization of personnel office, recruitment, interview, relationships, personnel planning, training and work measurement.

232 *Personnel Procedures and Problems* (3) Torpey

Spring—evening.

Study of such personnel functions as recruitment, selection, placement, promotion, supervisory evaluation, classification, and training. Personnel problems of personnel administration.

233 *Employee Development and Utilization* (3) Nixon

Spring—evening.

Study of ways and means of increasing employee potential, the use of training programs and incentive development, incentive systems.



- 237 *Intermediate Management and Supervision* (3) Eastin  
Fall—evening  
The role of the supervisor and intermediate manager; methods for improving group performance; work measurement; personnel regulations governing federal personnel.
- 241 *Human Relations in Governmental Administration* (3) Torpey  
Fall—evening  
Factors involved in working with people in governmental institutions. Study and research in human problems in management; planning of programs for improved human relationships.
- 251 *Governmental Budgeting* (3) Schwartz  
Fall—evening  
The role of budgeting in management; the technique and practice of budgetary formulation and administration.
- 252 *Planning and Administering the Agency Program* (3) Provan  
Spring—evening  
Personnel, budgeting, relating the work program to the total program; budgetary evaluation. This course is intended for students who have completed Public Administration 251.
- 254 *Comptrollership in the Federal Services* (3) Krieger  
Fall—evening  
Function of the comptroller in federal agencies; special problems regarding compliance of the comptroller function in government and business.
- 259 *Government Procurement and Property Management* (3) \_\_\_\_\_  
Fall—evening  
Principles and problems of government procurement; accounting and inventory control; development of organizational property management.
- 260 *Policy Formulation and Administration* (3) Brown  
Spring—evening  
Policy development and administration as the goals of the agency; procedures in the process of varied organization locally, nationally, internationally and abroad.

- 261 *Public Opinion and the Administrator* (3) Stromsem  
FALL—evening.

Theory, techniques, and methods of working with the public, the use of opinion groups in developing governmental programs, evaluating public relations programs, the importance of timing, use of public opinion measurement techniques.

- 262 *Contemporary Administrative Theory and Practice* (3) \_\_\_\_\_

Spring—evening.

Current theories and trends in management with particular attention to the behavioral sciences, communications, and applicability of research.

- 271 *Reading and Conference Course in Public Management and Administration* (3) Brown

Fall—as arranged, summer 1957.

The purpose of this course is to provide advanced students with directed reading in specific areas of public management and administration.

- 272 *Reading and Conference Course in Public Personnel Administration* (3) Torrey

Spring—as arranged.

The purpose of this course is to provide advanced students with directed reading in specific areas of public personnel administration.

- 299-300 *Thesis* (3-3) Brown and Staff

Academic year—evening.

One semester of the two semesters required will be conducted in seminar fashion.

#### COURSE OFFERED IN SPECIAL PROGRAM

In addition to the regular courses announced above, the University offers the following public administration course in the Air Force Advanced Management Program.

- 213 *Administration in Government* (3)

## CHEMISTRY

Benjamin Douglass Van Evera, Ph.D., Sc.D., Professor of Chemistry  
 Samuel Nathaniel Wrenn, Ph.D., Professor of Chemistry  
 Charles Rudolph Naesser, Ph.D., Professor of Chemistry, Executive  
 Officer

Robert Corbin Vincent, Ph.D., Professor of Chemistry  
 William Frederick Sager, Ph.D., Professor of Chemistry  
 Reuben Esselstyn Wood, Ph.D., Associate Professor of Chemistry  
 James Willard Harkness, B.S., Ed.M., Associate Professor of Chemistry  
 Theodore Peter Perros, Ph.D., Associate Professor of Chemistry  
 William Edward Schmidt, Ph.D., Associate Professor of Chemistry  
 David Gover White, B.Chem. Eng., Ph.D., Associate Professor of Chem-  
 istry

Clarence William Schimelfenig, M.S., Assistant Professor of Chemistry  
 Margaret Willcox McPherson, Ph.D., Lecturer in Chemistry  
 \_\_\_\_\_, Instructor in Chemistry

*Registration*—Before completing registration, each student must obtain from the representative of the Department an assignment to lecture, recitation, and laboratory sections.

*Bachelor of Arts or Bachelor of Science with a major in Chemistry (Columbia College—Departmental)*—Prerequisite: the Arts and Letters in the Science curriculum, respectively, in the Liberal College, see pages 66 and 97. The following laboratory sections must be included: Chemistry 11-12, 21, and 22; Mathematics 15 and 16; Physics 3, 6, 7 and 8.

Required: the general requirements as stated on pages 8-88, including the following number-group courses: Chemistry 111-112, 113-114, 115, 151-152, and 153 or 154 (two semester hours). The work of the junior and senior years must be approved by the Department. The German language is strongly recommended for all majors, and both French and German are recommended for students planning to do graduate work.

*Master of Arts or Master of Science in the Field of Chemistry (Columbia College)*—Prerequisite: the degree of Bachelor of Arts or Bachelor of Science, respectively, with a major in Chemistry from this University, or the equivalent.

Required: the general requirements as stated on pages 87-91. The thirty hours of required work must include Chemistry 151-152, 153, 111-112, 113-114, 151-152, 153-154, and the balance must include at least four semester hours of laboratory courses. On the basis of scores on your qualifying examination given during the first week of classes, a student may be excluded from the required courses and advised to take an appropriate course. A reading knowledge examination in French or German (German preferred) must be passed before the second half of the work is started.

*Doctor of Philosophy (Graduate Council)*—See page 95.

*Bachelor of Science in Engineering with an emphasis in Chemistry (School of Engineering)*—See pages 147-151, 143-145. The Chemistry courses required for this degree are the same as those required for the Bachelor of Science degree with the major in Chemistry as itemized above.



*Bachelor of Arts in Education with a teaching field in Chemistry (School of Education).—Prerequisite: the Education curriculum, year 28.*

*Required: the chemistry option, page 198; and the professional courses listed on page 192-71.*

## FIRST GROUP

3-4 *Fundamentals of Physical Science (4-4)* Schmidt

*A year course credit is not given for the first half until the second half is completed.*

*Academic year: Lecture 18 hours—recitation laboratory 15 hours—exercises.*

*Introduction to methods and nomenclature of physical science, covering selected topics in chemistry, physics, astronomy and geology. For non-science majors. Laboratory fee, \$11.8 a semester.*

11-12 *General Chemistry (4-4)* Naeser and Staff

*A year course credit is not given for the first half until the second half is completed.*

*Lecture 12 hours; laboratory 14 hours; recitation 11 hours.*

*First half: 1st—elementary chemistry and exercises; 2nd—elementary, atomic, and molecular structure. 1937. Second half: 1st—elementary and exercises; 2nd—elementary, atomic, and molecular structure. 1937.*

*Elementary course for general chemistry. Prerequisite: one year of high school science. Laboratory fee, \$18 a semester.*

21 *Qualitative Inorganic Analysis (4)* Vincent

*Lecture (2 hours); laboratory (4 hours).*

*Pharmaceutical and cosmetic types—chromium and cyanide, iron, tin, 1937.*

*Theoretical and practical parts of methods of separating and identifying the ions commonly found, and solving some analytical problems. Prerequisite: Chemistry 12. Laboratory fee, \$12.*

22 *Quantitative Inorganic Analysis I (4)* Schmidt

*Group lecture 12 hours—elementary and exercises; laboratory 10 hours—elementary, atomic, and molecular. Summer 1937.*

*Theory and practice of quantitative analysis by titration, gravimetry and gasometric methods. Prerequisite: Chemistry 21. Laboratory fee, \$18.*

## SECOND GROUP

11-12 *Physical Chemistry Lectures (3-3)* Wood

*A year course credit is not given for the first half until the second half is completed.*

*Academic year—lectures and exercises.*



Introduction to physical chemistry. Students enrolling for Chemistry 110-12 must register concurrently for Chemistry 110-14 since the course has laboratory credit in physical chemistry. Prerequisites: Chemistry 22 and 102. Modules 2, 3, 4, 5, 6, 7, 8.

113-14 *Physical Chemistry Laboratory* (2-2) Wood

A test course credit is not given for the first half until the second half is completed.

A year—Hutton and Smith's marriage

Laboratory in *introductory Chemistry 111-12*. Students registering for *Chemistry 113-14* must register concurrently for *Chemistry 111-12* unless they already have credit for lecture in physical chemistry. Laboratory fee \$18 a semester.

122 *Quantitative Imaging Analysis II* (4) Schmidt

Fig. 1. Diagram (a) shows the structure and numbering of the polymer (a) and the structure and numbering of the polymer (b).

Continuation of Chemistry 22 including theory and practice of experiments, course projects, electrochemistry, and laboratory in an office. Prerequisite: Chemistry 22. Laboratory fee \$45.

131-32 *Inorganic Chemistry* (2-2) Naeser

A post-mortem profit is not given for the last half until the second bid is announced.

[illegible]

Application of modern statistical methods to biological experimental and survey data. General study developed from the journal, *Statistical Science*, 1992, 17, 1, 1-14. The more common surveys, *Biometrics*, *Chemistry*, 1992, 152, 1, 1-14. *Proceedings of the American Statistical Association*, *Chemistry*, 1992, 152, 1, 1-14.

135-36 *Inorganic Chemistry: Preparations (2-2)* Petros

First half: fall-semester, spring-semester. Second half: spring-semester.

Application of the techniques of inorganic chemistry to the preparation and purification of a set of selected substances. Principles of Chemistry 112. Preparation of inorganic compounds; Chemistry 113(a) and 113-14. Laboratory in *Sol-a-solvent*.

151-52 *Organic Chemistry* (4-4) Sizer, Wrenn

A very loose credit is not given for the first half until the second half is completed.

24. 1971. 12—Larvae (1 larva), morning and evening, laboratory (3 larva), morning and evening, summer 1977. Second instar, spring—summer (1 larva), morning and evening, laboratory (3 larva), afternoon and evening, summer 1977.

Department of the University of California, Riverside\* Chemistry 21  
Laboratory Inc. Chemistry 131, 541, Chemistry 172, 50

\* The percentage of the total in the case of the studies who had earned a grade of C or lower in Chemistry. In addition, the past three years.

- 155 *Organic Chemistry: Preparations* (2 or 3) Wrenn  
Spring—evening.

Synthesis of organic compounds and application of the technique of organic chemistry to the preparation of pure compounds, using larger apparatus and greater refinements than in Chemistry 151-52. Prerequisite: Chemistry 22 and 152. Laboratory fee, \$10.50 a semester hour.

- 156 *Qualitative Organic Analysis* (3) Wrenn  
Fall lecture (1 hour), laboratory (6 hours)—evening.

Identification of pure organic compounds, separation of mixtures, and determination of their components. Required of all students planning their work in Organic Chemistry. Prerequisite: Chemistry 22 and 152. Laboratory fee, \$18.

- 191 *History of Chemistry* (2) Perros  
1957-58 and alternate years—spring—evening.

Historical development of chemistry. Prerequisite: Chemistry 22 and 152.

- 193 *Chemical Literature* (1) Wrenn  
Fall—evening.

A general course in chemical literature with reference work and reports. Prerequisite: Chemistry 22 and 152. Prerequisite or concurrent registration: Chemistry 111-12 and 113-14.

### THIRD GROUP

- 203 *Chemical Kinetics* (2) Wood  
1957-58 and alternate years—spring—evening.

The rates of chemical reactions and the factors influencing them. Prerequisite: Chemistry 112.

- 211-12 *Advanced Physical Chemistry* (2-2) Wood  
Academic year—evening.

Development of the principles of thermodynamics and kinetic theory and their application to chemical problems. Prerequisite: Chemistry 111-12 and 113-14.

- 216 *Statistical Mechanics* (3) Sager  
1958-59 and alternate years.

An introduction to classical and quantum statistics designed to acquaint the student with the basic principles and application of the method. Prerequisite or concurrent registration: Chemistry 212, or permission of instructor.

221-22 *Advanced Analytical Chemistry* (2 or 3) Schmidt

Lecture (2 hours) laboratory (3 hours—optional).

*First half*, not offered 1957-58. *Second half*, fall—evening.

Theory and application of recent methods of analysis including chemical and optical instrumentation. Prerequisite: Chemistry 22 and 122. The courses may be taken for 2 credits a semester without laboratory work; other half may be taken first. Laboratory fee, \$11 a semester.

231-32 *Special Topics in Inorganic Chemistry: the Chemistry of the Less Familiar Elements* (2-2) Perros, White

1957-58 and alternate years/ academic year—evening.

*First half*, the boronide and metalloids, emphasis on metallurgy and chemistry; titanium, zirconium, cerium, lanthanum, actinides, and thorium. *Second half*, carbon, hydrides, organometallics and organometallic compounds, and metal halogenides, chemistry and uses of less common elements such as germanium and selenium. Prerequisite: Chemistry 132 and 133.

233-34 *Radiochemistry* (2-2)

Not offered 1957-58.

The separation, properties, and uses of radioactive isotopes, both natural and artificial. Prerequisite: Chemistry 131-132.

251-52 *Advanced Organic Chemistry* (3-3) Sager

Academic year—evening.

Syntheses, reactions, and properties of various important functional groups of organic chemistry. Prerequisite: Chemistry 152. Prerequisite or concurrent registration: Chemistry 111-112, 113-114, and 193.

253 *Advanced Synthetic Organic Chemistry* (3) Wienn

Fall—evening.

Study of reactions employed in the synthesis of organic compounds. Prerequisite: Chemistry 251.

257 *Theoretical Organic Chemistry* (3) Sager

1957-58 and alternate years, fall—evening.

Survey of modern theories of organic chemistry with emphasis on reaction mechanisms. Prerequisite: Chemistry 134.

291-92 *Seminar: Recent Developments in Chemistry* (1-1) The Staff

Not offered 1957-58.

205-06 *Research* (arr.)

The Staff

*Academic year—s attached; summer 1957.**Research on problems approved by the Staff. Open to qualified students with advanced training. Laboratory fee, \$7.50 a semester hour.*207-300 *Thesis* (3-5)

The Staff

*Academic year—s attached; summer 1957.**Laboratory fee, \$48 a semester.*



## CIVIL ENGINEERING

- Carl Hugo Walther, B.E., M.C.E., *Professor of Civil Engineering*  
 Martin Alexander Mason, B.S. in Eng., Ing.-Dr., *Professor of Civil Engineering*  
 Robert Aaron Hechtman, M.S. in C.E., Ph.D., *Professor of Civil Engineering, Executive Officer*  
 Waldo Edward Smith, B.E. in C.E., M.S. in C.E., *Professorial Lecturer in Civil Engineering*  
 Ralph Edward Fuhrman, B.S. in C.E., M.S. in Eng., D.Eng., *Professorial Lecturer in Civil Engineering*  
 Alvin Loewer, Jr., B.E., Dr. Eng., *Professorial Lecturer in Civil Engineering*  
 Horace Maynard Trent, Ph.D., *Professorial Lecturer in Civil Engineering*  
 Raymond Hugh Eyman, C.E., *Associate Professor of Civil Engineering*  
 Alan Arthur Wells, B.S. in Eng., Ph.D., *Associate Professor of Civil Engineering*  
 Rolland Lee Hardy, B.S., B.S. in C.E., C.E., *Assistant Professor of Civil Engineering*  
 Joseph Lambert Intermaggio, M.R.P., *Lecturer in Civil Engineering*  
 Sheldon Norman Salzman, M.S., *Lecturer in Civil Engineering*  
 Gene Milo Nordby, Ph.D., *Lecturer in Civil Engineering*  
 Alexis Smislov, M.S. in C.E., *Lecturer in Civil Engineering*  
*Bachelor of Civil Engineering (School of Engineering).—See pages 137-4 for statement of requirements.*  
*Master of Science in Engineering (School of Engineering).—See pages 143-45 for statement of requirements.*  
*Civil Engineer (School of Engineering).—See page 147 for statement of requirements.*

### FIRST GROUP

- 12 *Surveying* (3) Eyman, Hardy  
 Spring—lecture (2 hours), field work (3 hours)—evening and Saturday.  
 Principles, methods, and instruments used in making land measurements, including layout, closure of simple traverse, traverse systems, and treatment of observational errors. Prerequisite: Mathematics 12, Mechanical Engineering 4. Surveying fee, \$15.
- 21 *Analytical Mechanics: Statics* (3) Eyman, Hardy  
 Fall—morning and evening, spring—morning and evening.  
 Free-body diagrams, equilibrium, stresses in simple frames and trusses.

analysis of simple members in tension, compression, bending, or torsion; strain and deformation; hydrostatics; friction; centroids and moments of inertia. Prerequisite: Physics 6. Prerequisite or concurrent registration: Mathematics 20.

24 *Strength of Materials* (3) Walther and Staff

Fall—morning and evening; spring—morning and evening.

Development and application of principles necessary to analyze stresses in and deformation of simple machine and structural components, combined stresses, strain energy, buckling of columns and beams, design of simple members and joints, composite members and simple reinforced concrete columns and beams, theories of failure. Prerequisite: Civil Engineering 21.

SECOND GROUP

121 *Analytical Mechanics: Dynamics* (3) Walther and Staff

Fall—morning and evening; spring—evening; summer 1957.

Kinetic friction; kinematics; translation, rotation, and plane motion of rigid bodies; work; energy; power; impulse; momentum; impact; simple vibrations. Prerequisite: Civil Engineering 21, Mathematics 1-3.

125 *Engineering Materials* (4) Wells and Staff

Fall: Lecture—morning and evening, laboratory—afternoon and evening.

Mechanical behavior of engineering materials including mechanical testing, elasticity, plasticity, fracture, ductility, creep, and fatigue; elements of metallurgy and physics of metals. Prerequisite: Chemistry 12, Physics 8, Civil Engineering 24. Laboratory fee, \$11.

128 *Substructures* (3) Wells

1957-58 and alternate years: spring—morning, 1958-59 and alternate years: spring—evening.

A limited study of substructure materials including soils and rocks and their properties as foundation material, seepage, plastic equilibrium, initial earth pressure, bearing capacity, and settlement; design of simple substructures. Prerequisite: Civil Engineering 125 and 144.

132 *Fluid Mechanics* (3) Mason and Staff

Spring: lecture—morning and evening, laboratory—afternoon and evening.

Development of the fundamental principles of flow of viscous and ideal compressible and incompressible fluids, dimensional analysis and model theory, laboratory work emphasizes principles, analysis of tests, and systematic observation of phenomena. Prerequisite: Civil Engineering 121, Mechanical Engineering 113. Laboratory fee, \$11.

135 *Hydraulic Engineering* (3)

Smith

Fall—evening.

Applied fluid mechanics, hydrology, principles of water conservation; introduction to flood control, water power, drainage and irrigation, canalization of rivers, multiple purpose projects, and general development of water resources. Prerequisite: Civil Engineering 132.

138 *Sanitary Engineering* (3)

Fuhrman

Spring—evening.

Collection, storage, purification, and distribution of water; sewerage systems and treatment of sewage. Prerequisite: Chemistry 12, Civil Engineering 135.

143-44 *Structural Theory and Analysis I-II* (4-4)

Smislova

1957-58 and alternate years: academic year—afternoon and evening.  
1958-59 and alternate years: academic year—afternoon.

Introduction to the structural behavior of statically determinate and indeterminate beams, frames, and trusses, and the application of basic principles to their analysis; matrix load analysis of simple metal, reinforced concrete, and timber structures. Structural laboratory. Prerequisite: Civil Engineering 24. Laboratory fee, \$41 a semester.

145 *Steel and Timber Structures* (3)

Hechtman

1957-58 and alternate years: fall—afternoon; 1958-59 and alternate years: fall—evening.

Design of steel and timber buildings, bridges, and decks; structural properties of steel and timber. Prerequisite: Civil Engineering 144.

146 *Concrete Theory and Design* (3)

Walther

1957-58 and alternate years: spring—afternoon; 1958-59 and alternate years: spring—evening.

Theory and design of plain and reinforced concrete structures. Prerequisite: Civil Engineering 144.

153 *Structural Theory and Analysis III* (3)

Hechtman

1957-58 and alternate years: fall—evening; 1958-59 and alternate years: fall—afternoon.

Further treatment of statically indeterminate structures. Introduction to plastic analysis, plate theory, and elastic instability; numerical and approximate methods of analysis. Prerequisite: Civil Engineering 144, Mathematics 112.

154 *Structural Dynamics* (3)

Walther

1957-58 and alternate years: spring—evening; 1958-59 and alternate years: spring—afternoon.

Theory of mechanical vibrations, vibrations in and dynamic loading on structures. Prerequisite: Civil Engineering 151.



- 157 *Advanced Mechanics of Materials* (3) Loewer  
Fall—evening

Selected topics in mechanics of deformable bodies including stresses at a point, general theory, special problems in the bending of straight and curved bars, torsion, stress concentration, fatigue, limitations of theories of failure, thick tubes, cylindrical tanks, thermal stress, and deformation beyond the elastic limit. Prerequisite: Civil Engineering 125, Mathematics 112. Prerequisite or concurrent registration: Civil Engineering 114 or Mechanical Engineering 125.

- 163 *Transportation Engineering* (3) Hardy  
Fall—evening

Planning, location, construction, operation, and maintenance of transportation systems. Prerequisite: Civil Engineering 12, 125.

- 168 *Regional and Urban Planning* (3) Internaggio  
Spring—evening

Introduction to regional and urban planning with emphasis on regional and transportation systems. Prerequisite: Civil Engineering 125.

### THIRD GROUP

- 251 *Theory of Structures* (3) Hechtman  
Fall—evening

Classical and matrix methods of structural analysis; basic theory of structures, statically determinate structures, including continuous beams and frames, arches, and suspension bridges; bending moment, shear, and axial force; influence lines; the force method; buckling of columns. Prerequisite: Civil Engineering 152, Mathematics 153.

- 256 *Theory of Elastic Stability* (3) The Staff  
Spring—evening

Buckling problems and methods of analysis (bifurcation, energy methods); lateral buckling of beams; buckling of thin plates; flat plates, stiffened flat plates, and shells; the post-buckling behavior of columns. Prerequisite: Engineering 251.

### ENGINEERING

The following courses are of basic interest in various specialties in engineering. They are listed under Civil Engineering only for convenience; they have equal value in all fields of engineering graduate study.

- 211-12 *Analysis of Engineering Systems* (3-3) Trent  
Autumn, year—evening

Application of fundamental engineering principles and analytical thought to the formulation and solution of correct design problems.



tions of physical systems in the fields of civil, electrical and mechanical engineering; study of motion and kinematic diagrams; various analytical and approximate numerical methods of solution; solution of partial differential equations and boundary value problems as illustrated for some continuous system analyses. Prerequisite: Graduate studies in engineering or physics; Engineering 341 is preferable to Engineering 412. Prerequisite: Mathematics 103. Prerequisite or corequisite: Mathematics 111.

221 *Theory of Elasticity* (3)

The Staff

Fall—evening

Stress and strain at a point; differential equations of equilibrium; boundary conditions; compatibility equations; and stress functions; two-dimensional problems in plane and axis-symmetry; stress energy methods; elementary three-dimensional problems; torsion and bending of prismatic bars; thermal stress. Prerequisite: Civil Engineering 144 or Mechanics Engineering 121; Mathematics 112.

225 *Plasticity of Solids* (3)

Wells

Spring—evening

Plastic flow and theories of yield; theory of plasticity (elastic solids); problems; basic concepts; plastic deformation of metals; tension and bending and plane strain problems; theory of fracture. Prerequisite: Engineering 221.

231 *Advanced Fluid Dynamics* (3)

Solomon

Fall—evening

Theory of compressible and incompressible fluid motion; momentum, potential motion, circulation and vorticity; mathematical treatment of flow at sub-, trans-, and supersonic velocities; general and elliptic flow; shock and elements of free stream. Prerequisite: Civil Engineering 132.

## CLASSICAL LANGUAGES AND LITERATURES

John Francis Latimer, Ph.D., *Professor of Classical Languages and Literatures, Executive Officer*

The Department of Classical Languages and Literatures offers two types of courses: (1) the course in *Greek and Roman Backgrounds in Literature*, which illustrates the literary, linguistic, and cultural backgrounds of Western Civilization, and for which no knowledge of the ancient languages is required. This course is designed to supplement and strengthen the broad general backgrounds of students who plan to concentrate in the fields of English or other literatures, History, Art, Drama, or Philosophy, or of those who wish to increase their general knowledge and appreciation of the bases of the great literary traditions as part of a well-rounded education. (2) Two years of Latin and two years of Greek are offered. These courses may be elected in fulfillment of the language requirements of the Junior College as set forth on pages 65-66.

### COURSE IN ENGLISH TRANSLATION

#### 71-72 *Greek and Roman Backgrounds in Literature* Latimer (3-3)

Not offered 1957-58.

Selected Greek and Roman masterpieces and their literary influence.

### LANGUAGE COURSES

#### 1-2 *First-year Latin* (3-3) Latimer

A year course; credit is not given for the first half until the second half is completed.

Alternate year-course.

Functional presentation of the essentials of the language, with appropriate reading selections. Development of English derivatives, and introduction to Roman life and literature.

#### 3-4 *Second-year Latin* (3-3) Latimer

A year course; credit is not given for the first half until the second half is completed.

1958-59 and alternate years.

A continuation of the preceding course, but with increased emphasis on reading Latin selections which illustrate Roman life and literature. Concentration on vocabulary building in English. Prerequisite: Classical Language 1-2 or two years of high school Latin.

**11-12 *First-year Greek* (3-3)**

Latimer

A year course: credit is not given for the first half until the second half is completed.

1958-59 and alternate years.

Essentials of grammar. Appropriate reading selections.

**13-14 *Second-year Greek* (3-3)**

Latimer

A year course: credit is not given for the first half until the second half is completed.

1957-58 and alternate years: academic year—evening.

Review of grammar. Emphasis on rapid reading from selected Greek authors.

**RELATED COURSES IN ANOTHER DEPARTMENT**

**Art 101 *Ancient Art* (3)**

**Art 102 *Medieval Art* (3)**

## DERMATOLOGY AND SYPHILOLOGY

- Harry Ford Anderson, M.D., *Professor of Dermatology and Syphilology, Executive Officer*  
 George William Creswell, A.B., M.D., *Assistant Clinical Professor of Dermatology and Syphilology*  
 Hayden Kirby Smith, B.S., M.D., *Assistant Clinical Professor of Dermatology and Syphilology*  
 James Quincy Gant, Jr., M.S., M.D., *Assistant Clinical Professor of Dermatology and Syphilology*  
 Theodore Clémenton Chen Fong, M.D., *Associate in Dermatology and Syphilology*  
 Wendell Melvin Willett, A.B., M.D., *Associate in Dermatology and Syphilology*  
 Reuben Goodman, M.D., *Associate in Dermatology and Syphilology*  
 Crawford Southwell Brown, A.B., M.D., *Clinical Instructor in Dermatology and Syphilology*

### 313 *Dermatology and Syphilology*

The Staff

Fall—1 hour a week

Lectures on diseases of the skin and syphilis.

### 317-18 *Clinic*

The Staff

Two weeks in rotation at arranged during academic year.

Case demonstrations, diagnosis, and treatment of skin diseases and syphilis. D. C. General Hospital.

### 407-8 *Clinic*

The Staff

Two times a week as arranged in rotation during academic year.

Dermatology and syphilology in infants and children. Children's Hospital.

### 409-10 *Clinic*

The Staff

Two hours a week as arranged in rotation during academic year.

Clinical demonstrations, diseases of the skin. University Hospital.



## ECONOMICS

Arthur Edward Burns, Ph.D., *Professor of Economics*

Donald Stevenson Watson, Ph.D., *Professor of Economics, Executive Officer*

Thomas Willard Holland, Ph.D., LL.B., *Professor of Labor Economics*

Gerhard Colm, Dr. rer. pol., *Professorial Lecturer in Economics*

Ralph Aubrey Young, Ph.D., *Professorial Lecturer in Economics*

George Wythe, Ph.D., *Professorial Lecturer in Economics*

Hans Heymann, Jr., M.L.A., *Professorial Lecturer in Economics*

Edward Campion Adelson, Ph.D., *Associate Professor of Finance*

John Whitefield Kendrick, Ph.D., *Associate Professor of Economics*

Wilson Emerson Schmidt, Ph.D., *Associate Professor of Economics*

John William Skinner, Ph.D., *Assistant Professor of Economics*

\_\_\_\_\_, *Assistant Professor of Economics*

*Bachelor of Arts with a major in Economics (Columbia College)—Departmental.*—Prescribes the Arts and Letters curriculum in the Junior College, including Economics 1-2 and Statistics 51, see page 66.

Required: the general requirements as stated on page 80-85 and (1) Economics 101-2 and 121 and three additional hours in economics courses to be selected with the approval of the adviser; (2) Economics 208 which may be taken upon the completion of twenty-one of the required hours in the major; (3) Statistics 111, 112; (4) nine semester hours of study in languages chosen from the following departments—Accounting, Business and Public Administration, History, Philosophy, Political Science, Sociology, and Statistics.

*Bachelor of Arts with a major in Labor-Economic Civilization (Columbia College—General Study).*—See the Department of History.

*Master of Arts in the field of Economics (Columbia College).*—Prescribes the degree of Bachelor of Arts with a major in Economics at this University, or the equivalent.

Required: the general requirements for the degree are stated on page 87-91. The thirty hours of required work must include (1) Economics 211 and nine semester hours in courses numbered 201-208, 213, 214, 215; (2) six semester hours in one of the following fields: public finance, monetary and fiscal policy (Economics 220-24, 214-16), labor economics (Economics 211, 241); monetary policy (Economics 208, 209); international relations (Economics 281-82, 221); and (3) three (Economics 202-3-4).

*Doctor of Philosophy (Graduate Council).*—See page 92.

*Bachelor of Arts in Government with a major in Economics (School of Government).*—See page 18-84.

*Master of Arts in Government with a major in Economic Policy (School of Government).*—Prescribes the degree of Bachelor of Arts with a major in Economics at this University, or the equivalent.

Required: the general requirements for the degree are stated on page 191-93.

194. The thirty hours of required work must include Economics 210, 265, 266, and the thesis, Economics 269-272.

For information concerning other Master of Arts curricula in the School of Government with courses in Economics, see pages 191-94.

#### FIRST GROUP

#### 1-2 *Principles of Economics*\* Kendrick, Skinner, and Staff (3-3)

Lecture (2 hours), recitation (1 hour).

*First half:* fall—morning and evening; spring—morning and evening, summer 1957. *Second half:* fall—evening; spring—morning and evening, summer 1957.

Survey of the major economic principles, institutions, and problems in contemporary life. Economics 1 is prerequisite to Economics 2.

#### SECOND GROUP

#### 101-2 *Economic Analysis* (3-3) The Staff

*First half:* fall—morning and evening; spring—evening; summer 1957.

*Second half:* spring—morning and evening, summer 1957.

Analysis of demand, supply, and consumer pricing, theory of national income determination, pricing of productive services, welfare economics. Economics 101 is prerequisite to 102.

#### 104 *History of Economic Thought* (3) Burns

Spring—morning.

History of the major schools of economic thought; influence of changing positions on the development of economic theory.

#### 105 *Business Cycles* (3) Kendrick

Fall—evening.

Analysis of strategic factors in economic instability; survey of recent business cycle theories.

#### 121 *Money and Banking* (3) Acheson

Fall—morning and evening; spring—morning, summer 1957.

Theory of money, credit, and banking; commercial banking and the Federal Reserve System; other financial institutions; international aspects of money; current financial problems.

#### 123 *Monetary Theory and Policy* (3) Acheson

1958-59 and alternate years.

Principal contemporary theories, background of recent monetary policy.

\* Economics 1-2 is prerequisite to all other courses in Economics.

- 124 *Financial Institutions and Economic Development* (3) Acheson  
1957-58 and alternate years fall—morning  
Evolution and growth of the money-mechanism in United States economy, changing relationships of money markets to rate of investment, special emphasis on monetary framework for national economic development.
- 126 *Foreign Exchange and International Finance* (3) Acheson  
Spring—morning  
The theory and practice of the foreign exchanges; current methods of international transfer.
- 133 *The Economy of the Soviet Union* (3)  
Not offered 1957-58  
Development and main features of the economic life of the Soviet Union. (See History 146, 246, and Geography 297).
- 141 *Industrial Relations* (3) Holland  
Fall—morning  
Development and practice of collective bargaining in American industry. Public control of industrial relations.
- 142 *Labor Economics* (3) Holland  
Spring—morning  
Wages, hours, and employment. Standards of living. Public policy.
- 161-62 *Public Finance and Taxation* (3-3) Schmidt  
1957-58 and alternate years, academic year—morning; 1958-59 and alternate years, academic year—evening  
General survey of government expenditures, sources and methods of taxation, economic effects of expenditures and taxes, and of government debt policies.
- 165 *Government Control of Economic Activity* (3) Watson  
Fall—evening  
Changing role of government in promoting and restricting economic activity, types and spheres of control.
- 166 *Comparative Systems of Economic Reform* (3) Watson  
Not offered 1957-58  
Critical analysis of the major theories of economic and social reform, with special attention to their origins and backgrounds.



- 171 *Economics of Transportation* (3) Not offered 1957-58.  
History, construction, competition, rates, and regulation of motor, air, rail, and water carriers.
- 172 *Economics of Public Utilities* (3) Not offered 1957-58.  
Regulation, valuation, investment, development, and public policy.
- 181-82 *International Economics* (3-3) Schmidt  
Analysis, trade-theory and exchange, summer 1957—Principles 181 (31).  
Survey of world economics, theories of international trade, analysis of international economic problems, and the international organizations.
- 183-84 *International Economic Policy* (3-3) Acheson  
Analysis, year—summer.  
Historical and theoretical analysis of tariff, exchange rates, exchange and trade control, discrimination, and external economic policies related thereto.
- 185-86 *Economic History and Problems of Latin America* (3-3) Wythe  
Analysis, year—summer.  
Evolution of the economy of Latin America with particular emphasis on present structure and problems, emphasis is on copper, sugar, and petroleum countries. Emphasis on special attention to Middle America. Economic and social conditions of South America.
- 198 *Readings and Research* (3) The Staff  
Fallows arranged, spring—staff arranged.  
Comprehensive survey of economics. Open only to students who have taken 197 or previous and who have completed twenty-one hours of course work in economics.

## THIRD GROUP

- 211-2 *History and Literature of Economic Thought* (3-3) Burns  
Analysis, year—summer.  
Critical analysis and interpretation of the development and the literature of economic thought, schools, and problems of the recent history of theory, and their relation to current problems and policies.



- 203-4 *Contemporary Economic Theory* (3-3) Watson  
Autumn year—evening  
The contributions of Marshall, Chamberlin, Robinson, Hicks, and others.
- 205 *Theory of Employment and Income* (3) Kendrick  
Fall—evening  
Determinants of the level of employment and income. Keynesian and classical systems contrasted, and recent literature on the subject.
- 206 *Business Cycle Theory* (3) Kendrick  
Spring—evening  
The general characterization of business cycle theories and comparison of particular theories.
- 208 *The National Income* (3) Kendrick  
Spring—afternoon  
The theory of national accounts, measurement and policy aspects of national income.
- 210 *Seminar in Economics* (3) —————  
Spring—evening  
Integration of economic theories, methods of research. Open only to students who have completed three hours of graduate work in economics.
- 211 *Readings in Advanced Economics* (3) Burns and Staff  
Fall—afternoon, open-on demand  
Integration and coordination of advanced economic theories.
- 213 *Economic Thought in the Twentieth Century* (3) Burns  
Summer 1947.  
Characterization of economic theory. The principal trends in economic thought during the present century.
- 214 *Quantitative Economics* (3)  
Not offered 1947-48.  
Some quantitative theory and some budget and income accounts; time-series and econometric analysis; aggregative econometric models; programming; mathematical economics; subjective analysis of changing composition of economic aggregates.

- 219-20 *Managerial Economics* (3-3) Watson  
 Summer 1957—Economics 219 (3).  
 Analysis of price, production, and inventory policies of business firms.
- 223-24 *Monetary Policy and Central Banking* (3-3) Young  
 Academic year—evening.  
 The money system in its relation to national income, monetary policies of the Federal Reserve and other central banking systems.
- 241 *Labor Economics* (3) Holland  
 Fall—evening.  
 Implications of industrialism for labor, questions of social policy, contributions of economics to solutions of labor problems.
- 244 *Collective Bargaining* (3) Holland  
 Spring—evening.  
 The collective bargaining contract and the elements comprising it, analysis of the policies of labor and of management.
- 251 *Theories of Economic Development* (3) Schmidt  
 Summer 1957.  
 Growth and change in economic activity, capital accumulation, innovations in technology and business organization.
- 261-62 *Public Finance and Fiscal Policy* (3-3) Colm  
 Fall—evening.  
 Survey of the major contributions to the theory and doctrine of public finance. Special problems, budget problems, current tax problems, and federal, state, and local relationships.
- 265 *Theory of Economic Policy* (3) Watson  
 Fall—evening.  
 The nature, basis, methods, and objectives of economic policy, the relation of economic theory to economic policy.
- 266 *Problems of Governmental Economic Policy* (3) Watson  
 Spring—evening.  
 The execution of economic policies as they are affected by the processes of government.
- 267 *Economic Organization of the Communist Orbit* (3) Heymann  
 Fall—evening.  
 Development of the Soviet-type economy, organization under the Soviet policy and problems: monetary, fiscal, production, distribution.

foreign trade, economic growth. (See also History 146, 246, and Geography 196.)

- 281-82 *International Economics* (3-3) Schmidt  
Academic year—evening.  
The modern theories of international economics, the variables determining the balance of payments, techniques to attain balance-of-payments equilibrium.
- 284 *United States Foreign Economic Policy* (3) Schmidt  
Not offered 1957-58.  
Analysis of foreign aid program; international, commercial, and monetary policy of the United States; United States and international economic organization.
- 285-86 *Economic Development of Latin America* (3-3) Wythe  
Academic year—evening.  
Current policies and programs, capital formation, public and private; foreign loans and investment; social and technological preconditions of development.
- 287-88 *Latin America: Trade and Commodity Policy* (3-3) Wythe  
Not offered 1957-58.  
Tariffs and exchange control systems, bilateral and general commercial agreements, terms of trade.
- 290 *Problems in International Financial Policy* (3) Acheson  
Spring—evening.  
International financial problems in recent decades and analysis of external economic problems of several countries.
- 299-300 *Thesis* (3-3) The Staff  
Academic year—as arranged, summer 1957.

#### COURSE OFFERED IN SPECIAL PROGRAMS

In addition to the regular courses announced above, the University offers the following course especially for students enrolled in the Navy Graduate Comptrollership Program and the Air Force Advanced Management Program.

- 195 *Governmental and Industrial Economics* (3)



## EDUCATION

- James Harold Fox, A.M., Ed.D., *Professor of Education*  
 Burnice Herman Jarman, A.M., Ed.D., *Professor of Education*  
 Blake Smith Root, A.M., Ed.D., *Professor of Education, Executive Officer*  
 \*Ralph Windsor Rutherford, A.M., Ed.D., *Professor of Education*  
 Ray LaForest Hamon, Ph.D., *Professorial Lecturer in Education*  
 Charles Edward Bish, A.M., Ed.D., *Professorial Lecturer in Education*  
 John Frederick Brougher, A.M., Ed.D., *Professorial Lecturer in Education*  
 Madeline Kinter Remmlein, Ph.D., J.D., *Professorial Lecturer in Education*  
 Joseph Bucoi Johnson, A.M., Ed.D., *Professorial Lecturer in Education*  
 Florence Mary Lumsden, A.M., Ed.D., *Professorial Lecturer in Education*  
 William Samuel Rumbough, B.S. in E.E., Ed.D., *Professorial Lecturer in Education*  
 Howard Odum Johnson, A.M., Ed.D., *Professorial Lecturer in Education*  
 Anthony Charles LaBue, B.S., Ed.D., *Associate Professor of Education*  
 Grover LaMarr Angel, A.M., Ed.D., *Associate Professor of Education*  
 Mary Ellen Coleman, A.M., *Assistant Professor of Education*  
 Carol Ruth St. Cyr, Ph.D., *Assistant Professor of Education*  
 William Andrew McCauley, Ph.D., *Assistant Professor of Education*  
 Harry Grubb Detwiler, A.M., *Assistant Professor of Education*  
 LaVerne Crabtree Walker, A.M., *Lecturer in Education*  
 Raymond Ray Reed, A.M., *Lecturer in Education*  
 Eugenia Campbell Nowlin, A.M., *Lecturer in Education*  
 John Carl Lang, A.M., Ed.D., *Lecturer in Education*  
 Levin Bartow Hamgen, B.S., Ed.D., *Lecturer in Education*

## CONSULTANTS IN RESEARCH

- Wesley Earl Armstrong, A.B., Ed.D., *Chief for Teacher Education, U. S. Office of Education*  
 John Robert Lunington, Ph.D., *Specialist of Industrial Arts, U. S. Office of Education*  
 Francis James Brown, Ed.D., *Staff Associate, American Council on Education*

\* On leave of absence 1957-58



## FIELD STUDIES

Robert Whittington Eiler, A.M., *Director of Field Studies*

## Field Service Coordinators

Alexander Anderson, A.M., *Assistant Principal, Washington-Lee High School, Arlington, Virginia*Mary Foust Mare, A.M., *Assistant Principal and Dean of Girls, Wakefield Junior-Senior High School, Arlington, Virginia*Claude Manby Richmond, B.S., A.M., *Principal, Stratford Junior High School, Arlington, Virginia**Bachelor of Arts in Education (School of Education).—Prerequisite:* the Education curriculum in the Junior College or the equivalent, or a certificate of graduation from an approved normal school in the insular area, and page 10.

Proposed: the satisfaction completion of a program of at least thirty-six semester hours in addition to the general education background courses in the Junior College curriculum. Each practice is planned individually to meet the educational requirements of the student, see pages 164-70.

*Master of Arts in Education (School of Education).—Prerequisite:* a Bachelor's degree from an accredited institution. Prerequisite not required individually. The following areas of specialization are available: (1) adult administration—training school superintendents in supervising school principals; (2) adult education—(3) secondary education; (4) elementary education; (5) curriculum; (6) educational statistics; (7) evaluation; (8) teaching. See pages 172-75.*Advanced Professional Certificate (School of Education).—See pages 176-77.**Doctor of Education (School of Education).—See pages 177-78.*

## A Reading Clinic

Coleman and Staff

Diagnosis of reading difficulties, individual or group lessons without textbook costs. Fee for diagnosis, \$15; for individual lesson, \$4.00; for group lesson, \$4.00; material fee, \$4.

## SECOND GROUP

100-101 *Learning and Teaching (3-3)*

McCauley

Lecture (1 hour), conference (1 hour), field work (2 hours) as arranged.

First half, 100—discussion and reading, summer 1947. Second half, 101—discussion, writing, observation and writing, summer 1947.

For the general student as well as the prospective teacher. First half, nature of learning approached through the study of classroom situations. Second half, nature of teaching approached through the observation of classroom situations.

111 *Methods in Elementary Education (6)*

LaBue

Full-day Tuesday and Thursday.

For progress in the elementary school curriculum. All interested students receive working with the learning experience designed to

meet the developmental needs of children in the natural and social sciences, the language arts, and concepts of number. Also includes the study of general classroom procedures and the evaluation of pupil progress. To be taken concurrently with Education 133. Prerequisite: Education 109-10 and 121-22.

113 *Elementary School Art* (3) Nowlin

Fall: lecture and laboratory (3 hours)—evening, field work—as arranged; summer 1957.

For juniors in the elementary school curriculum. Materials and methods. Prerequisite: Psychology 1 and 29. Material fee, \$1.50.

114 *Elementary School Music* (3) Reed

Spring: lecture (2 hours)—evening, field work (2 hours)—as arranged.

For juniors in the elementary school curriculum. Materials and methods. Prerequisite: Psychology 1 and 29.

115 *Teaching of Reading in the Elementary School* (3) Hanigan

Fall: lecture (2 hours)—evening, field work (2 hours)—as arranged.

A basic course in methods, techniques, materials, and activities essential to a good elementary school reading program. Prerequisite: Education 109-10 and 121-22 or teaching experience.

116 *Elementary School Social Studies* (3) St. Cyr

Spring: lecture (2 hours)—evening, field work (2 hours)—as arranged; summer 1957.

For teachers. Content and methods of teaching. Prerequisite: Education 109-10 and 121-22 or teaching experience.

117 *Elementary School Science* (3) St. Cyr

Fall: lecture (2 hours)—evening, field work (2 hours)—as arranged.

For teachers. Materials and methods. Prerequisite: Education 109-10 and 121-22 or teaching experience.

120 *Elementary School Arithmetic* (3) St. Cyr

Spring: lecture (2 hours)—evening, field work (2 hours)—as arranged; summer 1957.

For teachers. Content, materials, and methods. Prerequisite: Education 109-10 and 121-22 or teaching experience.

121-22 *Society and the School* (3-3) St. Cyr

Lecture (2 hours), conference (1 hour), field work (2 hours)—as arranged.

First half: fall—afternoon and evening; summer 1957. Second half: fall—afternoon, spring—afternoon and evening; summer 1957.

For the general student as well as the prospective teacher. *First half:* the local, national, and international facts of education; organization of the school with other community agencies. *Second half:* examination and operation of schools; principles and functions.

128 *Children's Literature* (3)

Walker

Spring: lecture (2 hours)—evening, field work (2 hours)—as arranged.

For teachers in the elementary school curriculum. Examining and evaluating the newer books for children and the child's reading; understanding the construction of literature in child development; appreciating children's original expressions. Prerequisite: Psychology 1 and 20.

131 *Common Teaching Skills* (3)

Detwiler

Fall—early afternoon; spring—late afternoon.

For seniors in the secondary school curriculum. Course aims and lesson planning; practical techniques used in connection with motivation, the assignment, group procedures, directing study, individual differences, evaluation, special features, discipline, the classroom, activity sponsorship, public relations. Prerequisite: Education 109-112 and 121-22.

133-34 *Observation and Student Teaching* (3-3 to 6)

Detwiler, McCauley, LaBue

A year course. Credit is not given for the first half until the second half is completed.

133A and 131B, 134B—as arranged, 133C, spring—as arranged.

134A, 134B, and 134C, spring—as arranged.

For seniors in the elementary or secondary school curriculum. Section A is a year course for students in the elementary school curriculum. Section B is a year course for students in the secondary school curriculum. Section C is for students enrolled in the intensive program. Education 131 student-teaching fee, \$50. Admission by permission of the instructor. Prerequisite: Education 109-112 and 121-22.

## SPECIAL METHODS COURSES\*

To be elected in the senior year after substantial preparation in the teaching fields covered by the students in the secondary school curriculum. Course requirements and hours of credit vary with course requirements. Practice of successful teachers are studied and actual teaching content as found in current texts and courses of study is reviewed.

136 *Teaching English* (2 to 4)

Lumsden

Spring: lecture (2 hours)—evening, field work (2 hours)—as arranged.

Prerequisite\*: eighteen semester hours in English.

\* Prerequisite to all special methods courses: Education courses 109-112 and 121. Additional prerequisites are stated under each course.



- 138 *Teaching Social Studies* (2 to 4) Root  
 Spring lecture (2 hours)—evening, field work (2 hours)—as arranged.  
 Prerequisite\*: twenty-four semester hours of social studies.
- 140 *Teaching Mathematics* (3) \_\_\_\_\_  
 Spring—late afternoon.  
 Prerequisite\*: Mathematics through calculus.
- 144 *Teaching Science* (2 to 4) Rambrugh  
 Spring lecture (2 hours)—late afternoon, field work (2 hours)—as arranged.  
 Prerequisite\*: twenty-four to forty semester hours of science.
- 146 *Teaching Foreign Languages* (2 to 4) \_\_\_\_\_  
 Spring—late afternoon.  
 Prerequisite\*: eighteen semester hours of one foreign language.
- 148 *Teaching Home Economics* (2) Kirkpatrick  
 Spring—afternoon.  
 Prerequisite\*: thirty semester hours in Home Economics.
- 150 *Teaching Business Subjects* (2) Shott  
 Spring—afternoon.  
 Prerequisite\*: thirty semester hours in business education.

## THIRD GROUP †

- 205-6 *The Curriculum* ‡ (§§ 3-3) Bish  
 Advanced year—Spring semester.  
 For experimental teachers. First half: curriculum development and basic construction of curricula patterns. Second half: principles and procedures in curricula development; group consideration of student problems.
- 207 *Curriculum Materials* § (§ 3) Bish  
 Second year.  
 For experimental teachers. Construction of course of study, general and specific, teaching aids and necessary materials; plans of courses in subjects and situations.

\* Prerequisite in all special records courses: Business Education 431108 and 431109. Admitted students are advised to take these courses.

† A letter from the committee indicates a preference for all third group courses.

‡ Prerequisite: education personnel preparation.



- 209 *Child Growth and Development* (3) LaBue  
 Publisher:  
 An introductory text approach to child development taking into account such factors as heredity and environment and socializing agents with particular emphasis on the home and school.
- 210 *Adolescent Growth and Development* (3) LaBue  
 Series—science, nature, 1957  
 A consideration of physical, intellectual, and cultural backgrounds of adolescence with particular emphasis on social development, adjustment to physical maturity, educational development and adjustment to school, and home relationships.
- 212 *Evaluation in Education\** (3) McCauley  
 Series—science, nature, 1957  
 Concept of evaluation, particularly focuses evaluation of ends and means, stress placed on the formation of learning objectives. As the course progresses such student develops techniques for evaluation systems related to the study situation.
- 213-14 *History of Education* (3-3) Jarman  
 Author's preface:  
*First half*, the European background of American education. *Second half*, the evolution of the American school system.
- 215 *Education of the Exceptional\** (3) LaBue  
 Not listed 1957-58  
 For classroom teachers: A survey of current problems in the education and guidance of educational handicaps. Notes and leads to those phenomena peculiar to emotionally handicapped pupils of the school. Reviews the field in assessment, diagnosis, therapy, selection, and evaluation.
- 216 *Education of the Slow-learning\** (3) LaBue  
 Series, 1957  
 Identification, nature, and needs of the slow-learning at the elementary and junior high school levels. Emphasis upon individual differences and demand for special classroom teachers who must provide special methods and materials in the education and guidance of the slow-learning. Also of interest to special-area teachers and administrators.
- 217-18 *Contemporary Problems in Education\** (3-3) Jarman  
 Author's preface—series, volume 1957-1958: 217 (1)  
*First half* devoted to help teachers appreciate a personal philosophy of education. *Second half* covers knowledge of educational problems at the time that shape the policies and changes of the future.

\* For complete volume personal possession.

- 219 *Elementary School Classroom Procedures* \* (3) LaBue  
Summer 1957.

Current classroom practices with particular emphasis on ways of planning, unit teaching, techniques in discipline, individual and group evaluation techniques, resources for learning, providing for individual differences.

- 220 *Intermediate Grade Education* \* (3)  
Not offered 1957-58.

A study of the curriculum and methods of teaching in the intermediate grades, based upon a growing understanding of the child and his environment.

- 221-22 *Early Childhood Education* \* (3-3)  
Not offered 1957-58.

For experienced teachers. *First half*: nursery school and kindergarten education. *Second half*: education in the primary grades.

- 223-24 *Reading Problems* \* (3-3) Coleman  
Academic year—evening.

For experienced teachers. A clinical approach to reading difficulties on elementary and secondary school levels. Demonstrations and observations, with case cases.

- 225 *Elementary School Reading* (3) Coleman  
Summer 1957.

Developmental and remedial approaches to reading problems. Demonstrations of diagnostic and corrective techniques used in the Reading Clinic.

- 227 *Basic Issues in Elementary Education* (3) LaBue  
Fall—Saturday morning.

A consideration of basic issues in the purposes, organization, and content of elementary education. Emphasis on the philosophical and psychological bases of fundamental assumptions as they relate to classroom practice.

- 228 *Instructional Areas in Elementary Education* (3) LaBue  
Spring—Saturday morning.

Critical appraisal of the objectives, organization, learning and evaluation, and teaching methods in the six broad areas of instruction in the elementary school.

\* Prerequisite: adequate professional preparation.

229 *Administration of Elementary Education* (3) LaBue

Spring—evening; summer 1957;

For experienced teachers and administrators. Administration as a means of achieving instructional objectives, improving learning and teaching activities, handling supplies and equipment, maintaining the building, and integrating school and community life. Emphasis upon guide lines to action.

231 *Secondary School Classroom Procedures*\* (3) Bish

Fall—evening; summer 1957.

Survey of current classroom practices with particular attention to selected topics such as teaching-pupil planning, group procedures, pupil transfer, initiative and summative activities, individual and group evaluation techniques, teaching aids, etc.; review of recent literature.

233 *Audio-visual Education*\* (3) J. Johnson

Spring: lecture (2 hours), laboratory (1 hour)—evening

Role of audio-visual materials in learning, selection, evaluation, and use of materials, a brief survey of problems in the case, operation, maintenance, and use of audio-visual materials and equipment. Material fee, \$7.

239 *Teaching the Core Curriculum*\* (3) Bish

Not offered 1957-58.

An examination and study of classroom teaching procedures appropriate to the core program.

241 *Education of the Gifted*\* (3)

Summer 1957.

For classroom teachers. Nature and discovery of giftedness, provisions for the gifted in regular classes, experimental projects.

243 *Human Relations in the Classroom*\* (3)

Summer 1957.

Principles and practices involved in interpersonal relationships between student and teacher and among learners.

245 *School and Community*\* (3) Angel

Not offered 1957-58.

The school as an important member of a team of social agencies that builds the community.

\* Prerequisite: adequate professional preparation.



- 251 *Guidance in Secondary Schools*\* (3) Brougher  
Fall—evening, summer 1957.  
Study needs, organization of the guidance service to students, the instructional staff, and the administration, personnel needed in the program.
- 254 *The Junior High School*\* (3) Bish, Root  
Notified 1957-58.  
Personnel, organization, core programs, guidance, developing course of study, extra-curricular activities.
- 255-56 *Secondary Education*\* (3-3) Root  
Academic year—evening, summer 1957.  
*First half:* current problems in the improvement of secondary education. *Second half:* current problems in each of the subject matter fields.
- 259-60 *Secondary School Management*\* (3-3) H. Johnson  
Academic year—evening.  
For experienced teachers and Administrators with two years of experience in secondary schools. Management planning, execution, and control, criteria of good management, construction of the master schedule, handling problems incident to the development of new policies and programs.
- 263-64 *Employee Training* (3-3) Root  
Academic year—evening.  
*First half:* nature and purposes, organization and administration of programs—orientation, executive summary, objectives, desired skills, training needs, and techniques—coordination with other non-agency functions. *Second half:* current positions, operating policies, and programs of selected organizations. Prerequisite: adequate performance preparation or two years of experience in employee training.
- 265-66 *Teaching Secondary School English* (3-3)  
Academic year—evening.  
A selective course for teachers of English. Discussion of new approaches to the subject matter. Contact in consultation with the departments of English and Speech. *First half:* communication skills—verbal, linguistic, nonverbal, and speech. *Second half:* American and English literature.
- 277 *Art Education* (3) Nowlin  
Spring—evening.  
For experienced teachers. Basic planning of teaching art education, use of visual and tactile media, emphasis upon visual analysis.

\*Temporary course scheduled previously.



and use of community resources. Designed to increase awareness of the creative process. Prerequisite: Education 113. Material fee, \$4.50.

271 *The Teacher and School Administration* • (3) Fox

Fall—Saturday morning.

A survey course for teachers and prospective administrators. Education and world affairs, national agencies, role of the state, local administration, school finance, local controls, school plans, public support, democratic administrative procedures, improving teaching conditions.

272 *The Teacher and School Supervision* • (3) Fox

Spring—Saturday morning; summer 1957.

Name, organization, human relationships, and techniques.

273-74 *Teacher Education* • (3-3) ———

Academic year—evening.

*First half:* aims, objectives, and basic issues; study of outstanding and experimental programs. *Second half:* recruitment and selection, general education, teaching-field preparation, professional sequences, laboratory experience.

276 *Seminar: Public Relations in School Administration* • (3) Root

Fall—evening.

Purpose, authentic materials, disseminating agencies, publicity media, public participation in policy making.

278 *School Law* • (3) Reumlein

Fall—evening.

Sources and scope of school law; legal rights and responsibilities of teachers, pupils, and taxpayers. Other legal problems of use or interest to the group.

279-80 *Adult Education* • (3-3) Detwiler

Academic year—evening, summer 1957—Edmonton 279 (3).

*First half:* present concepts and objectives, agencies involved, progress to all levels—international through community. *Second half:* the adult as a learner, the teacher of adults, learning-teaching activities, administration of adult education programs.

281 *Group Procedures in Education* • (3) Detwiler

Summer 1957.

Theory, practice, evaluation, and application to all educational levels.

\* Prerequisite: adequate professional preparation.

- 285 *Extra-classroom Activities*\* (3) Root  
Not offered 1957-58  
Nature and purposes of selected activities—honors, clubs, assemblies, school publications, student council, inter-school contests, particular attention to sponsorship, participation, finance, and evaluation.
- 287-88 *Clinical Study of Reading Problems*\* (3-3) Coleman  
Academic year—Saturday morning  
For advanced students. Diagnostic and corrective work under supervision in the Reading Clinic. Each student is expected to diagnose and treat pupils who are regarded as reading. Case studies are prepared and analyzed. Education 287, material for \$7. Prerequisite: Education 285-24 or the equivalent.
- 289-90 *Supervisory Problems in Reading*\* (3-3) Coleman  
Not offered 1957-58  
For experienced teachers, principals, supervisors, and superintendents. Consider the problems involved in planning, presenting, and appraising the total reading program, in promoting cooperative effort of the part of the staff toward improving reading education.
- 291 *Planning the School Plant* (3) Hanson  
Spring—evening  
Selection of sites; evaluation of existing buildings; utilization of present facilities; adaptation to curricular needs; building, operation, and maintenance systems.
- 293-94 *Research* (3-3) The Staff  
Academic year—as arranged  
Individual research under the guidance of a member of the staff. Progress and conclusions presented with an instructor.
- 295 *Educational Research Methods and Procedures* (3) Fox  
Fall—late afternoon; spring—late afternoon, summer 1957.  
Required of all Master of Arts candidates following Plan 2. Knowledge of elementary statistics required.
- 297 *Reading in Education* The Staff  
Fall—late afternoon; spring—late afternoon; summer 1957.  
To assist those preparing for the comprehensive examination. No credit toward degree requirements. Tuition fee, \$15.
- 299-300 *Thesis* (3-3) The Staff  
Academic year—as arranged  
Required of all Master of Arts candidates following Plan 1.

\* Prerequisite: adequate preparation in preparation.

## ELECTRICAL ENGINEERING

- Norman Bruce Ames, M.S., E.E., LL.B., *Professor of Electrical Engineering*  
 Forest Klaire Harris, Ph.D., *Professorial Lecturer in Electrical Engineering*  
 Ernest Frank, B.E.E., M.S. in E.E., Ph.D., *Associate Professor of Electrical Engineering, Executive Officer*  
 Nelson Thomas Grismore, Ph.D., *Assistant Professor of Electrical Engineering*  
 Robert Steven Ledley, D.D.S., A.M., *Assistant Professor of Electrical Engineering*  
 Dwight Edward Shytle, *Lecturer in Electrical Engineering*  
 Kermit Milton Lovewell, B.S. in E.E., *Lecturer in Electrical Engineering*  
 William Herbert Gossard, A.B., M.S. in E.E., *Lecturer in Electrical Engineering*  
 George Abraham, M.S., *Lecturer in Electrical Engineering*  
 William Walter Balwanz, B.E.E., M.S. in E.E., *Lecturer in Electrical Engineering*  
 James Milton Headrick, M.S., *Lecturer in Electrical Engineering*  
 Ralph Siegel, B.S. in E.E., *Lecturer in Electrical Engineering*  
 Peter Hans Sawitz, M.S. in E.E., *Lecturer in Electrical Engineering*  
 Llewellyn Adam Rubin, B.S. in E.E., *Instructor in Electrical Engineering*  
 Robert Jay Hermann, B.S. in E.E., *Associate in Electrical Engineering*  
 Michael Paul Strzelec, B.S., *Associate in Electrical Engineering*  
 Louis Samuel Rotolo, B.S. in E.E., *Associate in Electrical Engineering*

*Bachelor of Electrical Engineering (School of Engineering)*—See pages 147-39 and 141-42 for statement of requirements.

*Master of Science in Engineering (School of Engineering)*—See pages 143-45 for statement of requirements.

*Electrical Engineer (School of Engineering)*—See page 147 for statement of requirements.

### FIRST GROUP

#### 11 Electric Circuits (3)

Frank and Staff

1—lecturing and examing, spring—semester and evening.

Circuit, voltage, power, circuit parameters, Kirchhoff's laws and direct differential equations, single transient, RMS and average values, steady state work and node analysis, sinusoidal, transient, impedance, phasor work. Prerequisite: Mechanical Engineering 6, Physics 7. Corequisite or concurrent registration: Mathematics 20.



12 *Electric Machinery* (3) Ames and Staff

Spring—morning and evening; summer 1957

Principles of electromechanical energy conversion, methods of machine analysis, theory of d.c. and synchronous machines. Prerequisite: Electrical Engineering 11.

## SECOND GROUP

103 *Electric and Magnetic Fields* (3) Frank and Staff

Fall—morning and evening

Introduction to vector analysis, basic concepts of electrostatics and magnetostatics. Analysis of resistance, capacitance, inductance, forces, magnetic circuits. Prerequisite: Electrical Engineering 12, Mathematics 103.

104 *Field Analysis* (3) Balwanz

Spring—morning and evening

Solid angle, method of images, vector potential, magnetic scalar potential, conformal mapping, solutions of Laplace's equation, field plotting, analogues. Particle motion in electric and magnetic fields, introduction to Maxwell's equations. Prerequisite: Electrical Engineering 103. Prerequisite or concurrent registration: Mathematics 112.

107 *Steady-state Circuit Analysis* (3) The Staff

Fall—morning and evening

Four-terminal networks, network theorems, resonance, filters, coupled circuits, transmission lines, Fourier series. Prerequisite: Electrical Engineering 11, Mathematics 103.

111 *Electrical Measurements* (2) Harris

Fall—morning and evening

Systems of units, theory of errors, d.c. indicating instruments and electronic systems, precision measurement of voltage and resistance, magnetic measurements. Prerequisite: Electrical Engineering 12, Mathematics 103.

112 *Electrical Measurements* (2) Harris

Spring—morning and evening

Theory of a.c. indicating instruments, measurement of power, waveforms, a.c. bridges, frequency measurements. Prerequisite: Electrical Engineering 111.

113 *Electric Power Laboratory* (2) The Staff

Fall—morning and evening

Experiments in d.c. circuits, instruments, and machines. Prerequisite: Electrical Engineering 12. Laboratory fee, \$11.



- 114 *Electric Power Laboratory (2)* The Staff  
Spring—morning and evening.  
Experiments in a-c circuits, instruments, and machines. Prerequisite: Electrical Engineering 113. Laboratory fee, \$11.
- 118 *Alternating-current Machinery (3)* Ames  
Spring—morning and evening.  
Saturation and saliency in synchronous machines; theory of transformers, polyphase induction, static phase and control-type machines; machine transients and dynamics. Prerequisite: Electrical Engineering 12, 123, and 127.
- 123 *Communications Laboratory I (2)* Rubin and Staff  
Fall—morning and evening.  
Experiments at audio and video frequencies; a-c networks, bridges, amplifiers, and oscillators. Theory and use of electronic instruments. Prerequisite: Electrical Engineering 123, 127, and 112. Prerequisite or concurrent registration: Electrical Engineering 117. Laboratory fee, \$11.
- 124 *Communications Laboratory II (2)* Rubin and Staff  
Spring—morning and evening.  
Experiments at radio frequencies; impedance measurements, amplifiers, transmission lines, modulation. Experiments at microwave frequencies; antennas, waveguides, impedance, frequency, power, and standing-wave measurements. Prerequisite: Electrical Engineering 123. Prerequisite or concurrent registration: Electrical Engineering 127. Laboratory fee, \$11.
- 127 *General Network Analysis (3)* Rubin  
Fall—morning and evening.  
Laplace transforms, Fourier integral, poles and zeros of network functions, summation of time and frequency domain functions. Prerequisite: Electrical Engineering 127, Mathematics 112.
- 128 *Control System Analysis (3)* The Staff  
Spring—morning and evening.  
Transient analysis of control systems, transfer functions and stability criteria, introduction to servomechanism design. Prerequisite: Electrical Engineering 112 and 127.
- 131-32 *Electric Power Systems (2-2)* Ames  
Academic year—evening.  
Theory and application of symmetrical components, transmission and distribution, system stability and protection. Prerequisite: Electrical Engineering 118.

- 136 *Electromagnetic Waves* (3)      Grisamore  
Spring—morning and evening.  
Electromagnetic waves in bounded media; radiation from antennas; high-frequency transmission lines; cavity resonators and microwave devices. Prerequisite: Electrical Engineering 134; Mathematics 112.
- 137 *Electronic Circuits* (3)      The Staff  
Fall—morning and evening.  
Equivalent circuits of small-signal amplifiers; low-pass, band-pass, feedback, and power amplifiers; oscillators; amplitude and frequency modulation and detection. Prerequisite: Electrical Engineering 127; Physics 132; Mathematics 112.
- 171 *Modern Computing Machines* (3)      Ledley  
Fall—evening.  
Introduction to modern computing machines; basic principles; number systems; logic; control; programming; types of machines and principles of operation. Prerequisite: Mathematics 112.
- 172 *Machine Computer Circuitry* (3)      Ledley  
Spring—evening.  
Timing; counting; counter (circuits); relations between digital and mathematical operations; basic storage and switching circuits. Prerequisite: Electrical Engineering 137 and 171.
- 180-90 *Seminar in Electrical Engineering*      Frank, Abraham  
(1-1)  
A whole year—five afternoons.  
Oral and written presentation of technical papers by students, with group discussion and critical analysis. Prerequisite: senior status.

## THIRD GROUP

- 203 *Operational Analysis of Linear Systems* (3)      Headrick  
Fall—evening.  
Transient analysis of linear, lumped-parameter electrical and mechanical systems by operational methods with emphasis on Laplace transforms.
- 205 *Electronic Circuit Analysis* (3)      Sawitz  
Spring—evening.  
Methods of linear and non-linear analysis applied to passive and active networks including vacuum-tube and transistor circuits, and magnets and diodes and others.

207 *Steady-state Network Analysis* (3) Frank

Fall—evening

Analysis of lumped, linear networks: determinants, loop and node analysis, network theorems, two-port network formulas, steady complex frequency, network functions, and general network properties.

209 *Electromagnetic Field Analysis* (3) Sawitz

Fall—evening

Electrostatics, magnetostatics and Maxwell's equations; potentials of Laplace's equation; shielded systems; electromagnetic waves in bounded media; field analysis techniques.

211 *Physical Electronics* (3) The Staff

Spring—evening

Thermionic emission, charged particle motion in electric and magnetic fields, physical analysis of diodes and triodes, space charges and statistical distributions, electron optics, electronic principles of microwave tubes.

215 *Analysis of Modulation and Noise* (3) The Staff

Spring—evening

Analysis by Fourier series and integrals of signals and linear networks, modulation and demodulation, noise analysis including probability method of determining power spectra.

231 *Basic Concepts of Digital Computers* (3) The Staff

Spring—evening

General survey of computers, automatic systems, computer logic, basic components of digital computers, selected topics in algorithms, programming theory, and logic.



## ENGLISH

Robert Whitney Bolwell, Ph.D., Litt.D., *Professor Emeritus of American Literature in Residence*

Ernest Sewall Shepard, A.M., *Professor of English Literature*

Fred Salisbury Tupper, Ph.D., *Professor of English Literature*

Calvin Darlington Linton, Ph.D., *Professor of English Literature*

Charles William Cole, Ph.D., *Professor of American Literature, Executive Officer*

William Lewis Turner, Ph.D., *Associate Professor of English*

\*Robert Hamilton Moore, Ph.D., *Associate Professor of English Composition*

Averett Howard, A.M., *Associate Professor of English Composition*

Muriel Hope McClanahan, Ph.D., *Associate Professor of English Composition*

James Harold Coberly, Ph.D., *Associate Professor of American Literature*

Philip Henry Highfill, Jr., Ph.D., *Associate Professor of English Literature*

John Gage Allee, Jr., Ph.D., *Associate Professor of English*

John Palmer Reesing, Jr., Ph.D., *Associate Professor of English*

Robert Elemer Gajdusek, A.M., *Assistant Professor of English Composition*

Mary Jane Cook, A.M., *Instructor in English Composition*

Richard Bruce Fimo, A.M., *Instructor in English*

Joseph Lima, A.M., *Instructor in English Composition*

Elizabeth Truman Wright, A.M., *Instructor in English Composition*

Morton David Elevitch, A.M., *Instructor in English Composition*

Nancy Marie Patterson, A.M., *Instructor in English Composition*

*Bachelor of Arts with a major in American Thought and Civilization (Columbia College—Field of Study)*—Prerequisite: the Arts and Letters course in the Junior College, see page 65.

Required: the general requirements stated on page 50-51, and the grade "pass" on the American Thought and Civilization major examination at the end of the senior year. The coordinated field of knowledge upon which the student will be organized is summarized under four general headings: (1) European cultural history—the Renaissance and modern social and intellectual influences as a background to contemporary civilization with particular attention to English literature and history from the 16th through the 19th centuries; (2) American history—the political, economic, social and religious changes and extension of the American people; (3) American philosophy and the general sources of trends and movements with a knowledge of outstanding individuals; (4) American lit-

\* On sabbatical leave spring semester 1987-88.



ature—a knowledge of major writers, together with a study of poetry, fiction, and drama. The Department of English provides a preceptorial (English 179-80) intended to assist the student in preparing himself for the major examination. The major adviser will give to each student at registration a check list of available courses grouped as prerequisite, necessary, or desirable for the completion of the major study program.

*Bachelor of Arts with a major in English Literature (Columbia College—Field of Study).—*Prerequisite: the Arts and Letters curriculum in the Junior College described on page 66. It is recommended that prospective majors elect English 91-92 from among the listed offerings.

Required: the general requirements stated on pages 80-86, and the passing of the English Literature major examination at the end of the senior year. The field of specialized knowledge upon which the student will be examined at the end of his senior year is summarized under the following general headings: (1) the history of English literature from the Anglo-Saxon period; (2) the chief English writers (a certain familiarity with each man and his main works and a detailed knowledge of Shakespeare); (3) English social and political history as it bears upon or is reflected in the literature; (4) European intellectual background and movements which have affected English literature. The percentage of work taken in each of these areas should be worked out by the student in consultation with one of the English Literature advisers. The Department of English provides a preceptorial (English 192-200) to assist the student in preparing himself for the major examination. A detailed description of the major is available in the Office of the Dean of Columbia College.

*Master of Arts in the field of American Literature and Cultural History (Columbia College).—*Prerequisite: the equivalent of an undergraduate major in this University in (1) History (with American history as a major part), (2) American Thought and Civilization, or (3) English Literature (with introductory courses in American literature and American history). The student who has not taken any of the above majors at this University must take a remedial course.

Required: in addition to the general requirements stated on pages 80-86, the following specific requirements must be met: twelve of the required semester hours must be of senior study, six in American history and six in American literature; twelve of the required semester hours must be of second and third grade courses in the field of American history, literature, philosophy, education, and art recommended by the adviser; a thesis (six semester hours) in any of the foregoing fields or in some combination of them. Because of the various undergraduate majors which will be accepted for admission to this program, a check cannot yet be made by all students to assist in preparing them for the final Master's examination.

*Master of Arts in the field of English and American Literature (Columbia College).—*Prerequisite: an undergraduate major in English Literature or American Thought and Civilization at this University, or twenty-four semester hours in English and/or American literature above the sophomore level. The student who has not taken either of the above majors at this University must take a remedial examination. The student offering such preparation (English and American literature) will be examined in English and American literature.

Required: in addition to the general requirements stated on pages 80-86, the following specific requirements must be met: (1) a ph.d. of senior standing in twenty-four semester hours, planned in consultation with the adviser in the field of the student's undergraduate preparation, to include a comprehensive thesis in American literature and of English literature from 1800; (2) a Master's thesis (six semester hours) written upon an approved topic under the

direction of the instructor in whose field the major portion of the material falls; (3) a final written examination, on American literature and on English literature from 1700.

*Master of Arts in the field of English Literature (Columbian College).—*Prerequisite: an undergraduate major in English Literature at this University, or twenty-four semester hours in English literature above the sophomore level. The student who has not passed the major examination in English at this University must take a candidacy examination which, in its scope and difficulty, is comparable to the major examination in English.

Required: in addition to the general requirements stated on pages 80-82, the following specific requirements must be met: (1) a schedule of courses amounting to twenty-four semester hours, planned in consultation with the adviser; (2) a Master's thesis (six semester hours) written upon an approved topic under the direction of the instructor in whose field the material falls; and (3) a final written examination.

*Doctor of Philosophy (Graduate Council).—*See page 96.

*Bachelor of Arts in Education with a teaching field in English (School of Education).—*Prerequisite: the Education curriculum, page 98.

Required: the English option, pages 165-166; and the professional courses listed on pages 166-7.

## ENGLISH COMPOSITION

### FIRST GROUP

#### A *English Practice* (3) The Staff

Fall—as arranged; spring—as arranged; summer 1957.

Instruction, drill, and exercises in grammar, vocabulary, spelling, and mechanics in general; instruction and exercises in composition and reading. This course is designed to prepare students for English 1.

#### B *English for Foreign Students* (3) Allee

Fall—morning and evening, spring—morning and evening, summer 1957.

A course in reading and writing designed to prepare the student for English 1. Special attention is given to spelling, syntax, grammar, idiom, and vocabulary.

#### 1 *English Composition*\* (3) More and Staff

Fall—morning and evening, spring—morning and evening, summer 1957.

Review of grammar, exercises in composition, readings.

\* These courses are included in English 1; they are listed in the schedule preceding it. Students, upon entering, should spend time and energy on English 1. Those students who are required to take one course of English 1 will follow the schedule of English 1. Those who are required to take two courses of English 1 will follow the schedule of English 1, both semesters of one of the introductory courses of English 1.

English 1 is a prerequisite to all other courses in English. English 1 is the first half of the first semester course requirement of students not required to follow the introductory College program.

- 2 *English Composition*\* (3) Moore and Staff  
 Fall—morning and evening; spring—morning and evening; summer 1957.  
 Exercises in composition, readings. The second half of the six-hour English Composition course required of all students not in the pre-Columbian College curricula.
- 4 *English Composition*\* (3) Moore and Staff  
 Fall—morning and evening; spring—morning and evening; summer 1957.  
 A course in critical analysis and practice of expository and argumentative to help and in research problems. The second half of the six-hour English Composition course required of students in the pre-Columbian College curricula. Prerequisite: English 1 and both semesters of one of the introductory literature courses.
- 11 *The Writing of Reports* (3) Turner and Staff  
 Fall—morning and evening; spring—morning and evening; summer 1957.  
 Theory and practice in the writing of technical reports. Prerequisite: English 1, and 2 or 4.

## SECOND GROUP

- 109 *Expository Writing* (3) Howard and Staff  
 Fall—evening.  
 A study of types of expository writing with weekly exercises. Prerequisite: English 1, and 2 or 4.
- 110 *Narrative Writing* (3) —————  
 Spring—evening.  
 Study of the techniques of narrative writing and also criticism of student writing. Prerequisite: English 1, and 2 or 4.
- 115 *The Writing of Fiction—the Short Story* (3) —————  
 Fall—evening.  
 Prerequisite: English 110; consent of instructor.
- 116 *Advanced Exposition* (3) Moore  
 Not offered 1957-58.  
 Theory and practice in the writing of expository articles and essays. Prerequisite: English 110; consent of instructor.

\* See footnote on page 302.



- 117-18 *The Writing of Fiction--the Novel* (3-3) Howard  
Academic year--evening.  
Writing a novel. Prerequisite: English 110; consent of instructor

## ENGLISH LITERATURE

## FIRST GROUP

- 51-52 *Introduction to English Literature*\* Tupper and Staff  
(3-3)  
Academic year--morning, afternoon, and evening; summer 1957  
A historical survey. Prerequisite: English 1.
- 91-92 *Introduction to European Literature*\* Shepard and Staff  
(3-3)  
Academic year--morning and evening  
Consideration of various types. Prerequisite: English 1.

## SECOND GROUP\*

- 121-22 *English Literature from the Beginnings to 1500* (3-3) Allee  
Academic year--evening.  
*First half:* English literature prior to Chaucer. *Second half:* Chaucer
- 125 *The Evolution of Modern Speech* (3) Allee  
Fall--evening.  
The development of the English language in a historical treatment of English grammar.
- 129-30 *Elizabethan Nondramatic Literature* (3-3) Tupper  
Not offered 1957-58  
Nondramatic literature from 1485 to 1601
- 135-36 *Shakespeare* (3-3) Tupper  
Academic year--evening; summer 1957--English 116 (1).

\* All pre-Columbian College students who are required to take one year of English composition and one year of literature in English, Classical Languages, French, German, or Spanish will follow the sequence of Eng. A 1, and substitute one of the introductory literature courses and English 4.

English 41-52, 71-72, 91-92, Classical Languages and Literature 71-72, French 11-37, German 31-32, or Spanish 31-32 is prerequisite for all second-group courses except English 115.



- 139-40 *The Seventeenth Century* (3-3) Reesing, Linton  
Academic year—morning.  
*First half:* poetry and prose from 1603 to 1660. *Second half:* Milton.
- 141-42 *The Neoclassical Movement* (3-3) Highfill  
Not offered 1957-58.  
Poetry and prose from 1660 through the mid-eighteenth century.
- 151-52 *The Romantic Movement* (3-3) Reesing  
Academic year—morning.  
From the mid-eighteenth century through Shelley and Keats.
- 161-62 *Victorian Literature* (3-3) Shepard  
Academic year—morning; summer 1957—English 162 (3).  
Poetry and prose from 1830 to 1900.
- 165-66 *The Twentieth Century* (3-3) Linton  
Academic year—morning.  
British poetry, prose, and drama since 1900.
- 181-82 *The English Novel* (3-3) Reesing  
Academic year—evening.  
Major English novelists from the eighteenth century to the present day.
- 183-84 *The English Drama* (3-3) Highfill  
Academic year—morning; summer 1957—English 183 (3).  
*First half:* concerned principally with the drama of Shakespeare's contemporaries. *Second half:* a historical survey from 1600 to the present day.
- 192 *Medieval Legend and Saga* (3) Alice  
Summer 1957.  
Celtic and Norse.
- 199-200 *Proseminar: Readings for the English Literature Major* (3-3) Tupper, Highfill  
Academic year—afternoon and evening.  
Conferences and group discussions.

## THIRD GROUP

- 223-24 *Old English* (3-3) Allee  
1958-59 and alternate years.  
English language and literature before 1100. *First half*, Old English grammar and readings. *Second half*, Beowulf.
- 235-36 *Studies in Shakespeare and His Contemporaries* (3-3) Tupper  
(3-3)  
1957-58 and alternate years; academic year—evening; summer 1957—English 206 (3).  
Prerequisite: English 135-36.
- 239-40 *Studies in Seventeenth-Century Literature* (3-3) Linton  
1958-59 and alternate years.  
Open to qualified undergraduates. *First half*, chief figures exclusive of Milton. *Second half*, Milton.
- 241-42 *Studies in Neoclassical Literature* (3-3) Highfill  
1957-58 and alternate years; academic year—evening.  
Prerequisite: English 141-42.
- 251-52 *Studies in the Romantic Movement* (3-3) Reesing  
1958-59 and alternate years.  
Prerequisite: English 151-52.
- 261-62 *Studies in Victorian Literature* (3-3) Shepard  
1958-59 and alternate years.  
Prerequisite: English 161-62.
- 265-66 *Studies in Twentieth-Century Literature* (3-3) Linton  
*First half*, fall—evening. *Second half*, not offered 1957-58. Summer 1957—English 266 (3).  
Riot and his contemporaries.
- 295-96 *Studies in the History of English Literary Criticism* (3-3) Shepard  
1958-59 and alternate years.  
Open to undergraduates with the approval of the instructor.
- 299-300 *Thesis* (3-3) The Staff

## AMERICAN LITERATURE

## FIRST GROUP

- 71-72 *Introduction to American Literature*\* Bolwell and Staff  
(3-3)

Academic year—morning and evening, summer 1957.

A historical survey. *First half*: from the beginnings to the Civil War. *Second half*: from Civil War to the present. Prerequisite: English 1.

## SECOND GROUP\*

- 170 *The American Short Story* (3) Coberly

Summer 1957.

The historical development of the short story in America.

- 171-72 *Studies in American Literature* (3-3) Cole

1957-58 and alternate years; academic year—morning, 1958-59 and alternate years; academic year—evening.

Major factors in the national cultural tradition as shown by outstanding writers. Prerequisite: English 51-52 or 71-72.

- 173-74 *Major American Poets* (3-3) Coberly

*First half*: not offered 1957-58. *Second half*: fall—evening.

Advanced critical study of significant writers and movements. *First half*: from beginnings through nineteenth century. *Second half*: the twentieth century.

- 175-76 *American Drama* (3-3) Bolwell

1957-58 and alternate years; academic year—evening, 1958-59 and alternate years; academic year—morning, summer 1957—English 170 (3).

Historical and critical study of significant plays and forms. *First half*: from beginnings through nineteenth century. *Second half*: the twentieth century.

\* All non-Colombian College students who are required to take one year of foreign language and one year of literature in English, Classical Languages, French, German or Spanish, may follow the sequence of English 1, both semesters of one of the introductory literature courses, 201, English 4.  
English 51-52, 71-72, 91-92, Classical Languages and Literatures 71-72, French 51-52, German 51-52, or Spanish 51-52 is prerequisite to all non-Colombian courses except English 171-72.

- 177-78 *American Fiction* (3-3) Coßerly  
 1957-58 and alternate years: academic year—morning; 1958-59 and alternate years: academic year—evening; summer 1957—English 178 (3).  
 Historical and critical study of significant novels and short stories. *First half*: from beginnings through nineteenth century. *Second half*: the twentieth century.
- 179-80 *Proseminar: Readings for American Thought and Civilization Majors* (3-3) The Staff  
 Academic year—as arranged.  
 Conference and group discussions.

## THIRD GROUP

- 271-72 *Seminar: American Literature* (3-3) Bolwell  
 1957-58 and alternate years: academic year—as arranged.  
 Prerequisite: English 171-72 or the equivalent.
- 277-78 *Studies in American Fiction* (3-3) Coßerly  
 1957-58 and alternate years: academic year—as arranged.  
 Prerequisite: English 177-78 or the equivalent. Open to the undergraduate with the approval of the instructor.
- 279-80 *Thesis* (3-3) The Staff

## RELATED COURSES IN OTHER DEPARTMENTS

- Education 136, *Teaching English*  
 History 151-52, *English History*  
 Philosophy 111-12, *History of Philosophy*



## GEOGRAPHY

Robert Dale Campbell, Ph.D., *Professor of Geography, Executive Officer*

Harland Walter Westermann, A.M., *Assistant Professor of Geography*

Richard Ernest Murphy, A.M., *Assistant Professor of Geography*

*Bachelor of Arts with a major in Geography (Columbia College—Departmental).*—Prerequisite: the Arts and Letters curriculum in the Junior College, as prescribed. It is strongly recommended that the mathematics include Biology 1-2, Economics 1-2, History 71-72, and Statistics 91-92. Electives must include Geography 51 and 52.

Required: in addition to the general requirements as stated in pages 8-9, twenty-four semester hours of Geography by one first-group course, including Geography 103-4, 113, and 114; fifteen semester hours in one or more of the following departments: Biology, Geography, Economics, History, Political Science, and six semester hours of Mathematics.

*Master of Arts in the field of Geography (Columbia College).*—Prerequisite: the degree of Bachelor of Arts with a major in Geography from this University or the equivalent.

Required: the general requirements as stated on pages 87-91. The thirty hours of required work must include Geography 201-2 and 202-3.

*Bachelor of Arts in Education with a teaching field in Geography (School of Education).*—Prerequisite: the Education curriculum, page 128.

Required: the Geography course, page 106, and the professional course listed on page 106-7.

*Doctor of Philosophy (Graduate Council).*—See page 90.

### FIRST GROUP

- 51 *Introduction to Geography* (3) Campbell, Westermann  
Fall—morning; spring—evening; summer 1957.

A study of place attributes and characteristics; patterns and associations of physical and cultural earth features.

- 52 *World Regions* (3) Campbell, Westermann  
Fall—evening; spring—morning; summer 1957.

The analysis of world regional divisions, description and interpretation of major atmospheric, evaluation of regional differences as they affect the distribution and activities of man.

### SECOND GROUP

- 103-4 *Cartography* (3-3) Westermann

A year course; credit is not given for the first 103 and the second 104 is completed.

Academic year—Saturday morning and afternoon.

Principles of cartographic drafting, elementary map projections, map

and graph planning, design, and construction; uses and interpretation of maps. Prerequisite: Geography 51 and 52. Laboratory fee, \$11 a semester.

113 *Geomorphology* (3) Murphy

Spring: lecture—evening, laboratory—as arranged.

The nature and evolution of earth forms, with special emphasis upon relief features of North America. Prerequisite: Geography 51.

114 *Weather and Climate* (3) Murphy

Fall: lecture—evening, laboratory—as arranged.

rudimentary atmospheric physics, air mass and frontal weather systems, seasonal climatology. Prerequisite: Geography 51.

125 *Economic Geography: Trade and Transportation* (3) Murphy

1957-58 and alternate years: fall—morning.

The influence of geographic factors on the forms of transportation and upon trade routes and centers.

126 *Economic Geography: Raw Materials* (3) Murphy

1957-58 and alternate years: spring—morning.

Location and utilization of raw materials essential to modern technology; position of the United States with regard to raw materials.

127 *Economic Geography: Manufacture* (3)

1958-59 and alternate years.

Location and distribution of manufacturing industries; analysis of the factors determining both internal structures and external relationships of selected industries.

128 *Economic Geography: Agriculture*\* (3)

1958-59 and alternate years.

Analysis of types and distribution of agricultural practices; economy, character of predominantly agricultural economies.

131 *Conservation of Natural Resources*\* (3)

1958-59 and alternate years.

Principles and problems of conservation of vital natural resources—soil, water, forests, minerals, fuels, wildlife. Prerequisite: Geography 51 and 52.

\*The following courses are strongly recommended for students particularly interested in land use, agricultural economics, and conservation: Planning 343-42, *Plant Geography* 343, *Introduction to Plant Geography* 344, *The Vegetation of North America*, and 351, *Soils*.

132 *Land Use\** (3)

1958-59 and alternate years.

Principles of geographic area analysis and land planning. Prerequisite: Geography 51 and 52.

141 *Geography of Settlement* (3)

Westermann

1957-58 and alternate years: fall—evening

The study of the nature and basis of settlement, and of population trends and patterns. (Sociology 141, *Population Problems*, is strongly recommended as an elective for students particularly interested in demographics.)

142 *Urban Geography* (3)

Westermann

1957-58 and alternate years: spring—evening

Location, form, and function of cities. (Sociology 140, *Urban Sociology*, is strongly recommended as an elective for students particularly interested in urban studies.)

145 *World Cultural Geography* (3)

Koenig

Fall—afternoon

Cultural variations from place to place on the surface of the earth, their development, cultural aspects of regional personality.

146 *World Political Geography* (3)

Koenig

Spring—afternoon.

171 *Field Geography* (3)

Westermann

Summer 1957.

Field study methods, training in mapping and analysis techniques for both rural and urban areas. Prerequisite: Geography 51 and 52. Transportation fee, \$18.

174 *Map Interpretation* (3)

Murphy

Summer 1957.

Map elements and uses, map reading, interpretation and evaluation of maps. Prerequisite: Geography 123-4.

183 *Western Europe†* (3)

1958-59 and alternate years.

184 *The Mediterranean†* (3)

1958-59 and alternate years.

\* See *Geography* 123-4 for more information.  
† See *Geography* 123-4 for more information.



- 185 *Africa*\* (3)  
Not offered 1957-58.
- 186 *The Middle East*\* (3) Campbell  
Spring—morning.
- 191 *Middle America*\* (3) Murphy  
1957-58 and alternate years fall—evening.
- 192 *South America*\* (3) Murphy  
1957-58 and alternate years spring—evening.
- 195 *Eastern and Southeastern Asia*\* (3)  
Not offered 1957-58.
- 196 *The Soviet Union*\* (3) Campbell  
Fall—morning.
- 197 *The Pacific*\* (3)  
Not offered 1957-58.
- 198 *Australia*\* (3)  
Not offered 1957-58.

## THIRD GROUP\*

- 201-2 *Seminar: History and Philosophy of Geography* (3-3) Campbell  
A year course; credit is not given for the first half until the second half is completed.  
Academic year—evening.
- 211-12 *Reading Course in Economic Geography* (3-3) Murphy  
A year course; credit is not given for the first half until the second half is completed.  
Academic year—evening.
- 221 *Seminar: Military Geography* (3) Campbell  
Summer 1957.

\* Regional survey. No prerequisite. For students particularly interested in the study of specific regions, related courses in the departments of Economics, History, and Political Science are strongly recommended. For example, Economics (101), Economic History and Problems (102), Europe (103), Latin America and Caribbean (104), and Eastern Europe (105).  
† Some major or graduate status is required in all third group courses.



231-32 *Seminar in Geography* (3-3)

Not offered 1957-58.

251-52 *Seminar: World Problem Areas* (3-3)

Not offered 1957-58.

275-76 *Research* (3-3)

The Staff

Academic year—as arranged.

Special directed studies.

299-300 *Thesis* (3-3)

The Staff

COURSE OFFERED IN SPECIAL PROGRAM

In addition to the regular courses announced above, the University offers the following course especially for students enrolled in the Engineering Administration program.

271 *Engineering Geography* (3)

## GEOLOGY

Geza Teleki, Ph.D., *Associate Professor in Geology, Executive Officer*  
 Charles Louis Christ, Ph.D., *Professorial Lecturer in Geology*  
 Michael Fleischer, Ph.D., *Professorial Lecturer in Geology*  
 Howard Tasker Evans, Jr., Ph.D., *Lecturer in Geology*  
 Irving Friedman, Ph.D., *Lecturer in Geology*

*Bachelor of Arts or Bachelor of Science with a major in Geology (Columbia College—Department 1).—Prerequisite: the Arts and Letters in the Science curriculum, respectively, in the Junior College, pages 66-67. Required: Chemistry 11-12; Physics 5, 6; Biology 1-2, and eighteen semester hours of Geology beyond the first-group courses.*

*Master of Arts or Master of Science in the Field of Geology (Columbia College).—Prerequisite: the degree of Bachelor of Arts or Bachelor of Science, respectively, with a major in Geology from this University, or the equivalent. Required: the general requirements as stated on pages 87-91.*

### FIRST GROUP

#### 1-2 *General Introductory Geology*\* (3-3) Teleki

Academic year—lecture (2 hours), laboratory or field trip (3 hours)—morning.

Survey course covering the principles of physical geology, geology, and mineralogy. Laboratory fee, \$5 a semester.

#### 51-52 *Paleontology and Stratigraphy* (3-3) The Staff

Academic year—evening.

Lectures and laboratory work on classification and structure of fossil invertebrates, vertebrates, and plants, including their use as guide fossils in stratigraphic geology. Laboratory fee, \$5 a semester.

### SECOND GROUP\*

#### 111 *Crystallography* (3)

Not offered 1937-38.

Elements of crystal structure.

#### 121-22 *Structural Geology* (3-3) Teleki

Academic year—morning.

Interpretation of geological formations on the basis of their structures. Lectures and field work.

\* Geology 1-2 is prerequisite to all second-group courses.

- 131 *Economic Geology* (3) The Staff  
Not offered 1957-58.

Economic aspects of geological structures and communities with particular reference to the raw materials necessary to modern civilization.

- 162 *Regional Geology* (3) The Staff  
Not offered 1957-58.

Lectures and map work on the physiographic regions of the Western Hemisphere.

### THIRD GROUP

- 211 *X-ray Crystallography* (3) Christ  
Not offered 1957-58.

Structure of crystals as determined by the X-ray method.

- 212 *Crystal Chemistry* (3) Evans  
Not offered 1957-58.

The structure of minerals as determined by the X-ray method.

- 215-16 *Seminar* (3-3) Teleki  
Academic year—evening.

Detailed study of some phase of geology with review of current literature.

- 241 *Geochemistry* (3) Fleisher  
Fall—evening.

A comprehensive study of the principles and laws of geochemistry pertaining to the abundance, relationships, and distribution of the elements in the various rock and mineral species.

- 244 *Isotope Geology* (3) Friedman  
Spring—evening.

A comprehensive study of the principles and laws of isotope geology and their application to geologic problems.

- 245-46 *Research* (independent) Teleki  
Not offered 1957-58.

Original work on individual problems.

- 297-300 *Thesis* (3-3) The Staff

Academic year—unassisted.

## GERMANIC LANGUAGES AND LITERATURES

Gretchen Louisa Rogers, Ph.D., *Associate Professor of German*  
 Wolfram Karl Legner, Ph.D., *Associate Professor of German, Executive Officer*

James Cecil King, Ph.D., *Assistant Professor of German*

*Bachelor of Arts with a major in Germanic Languages and Literatures (Columbian College—Departmental)*—Prerequisite: the Arts and Letters curriculum in the Junior College, see page 66.

Required: in addition to the general requirements as stated on pages 8–80, German 81–82 plus eighteen semester hours in German courses above the first group; a reasonable proficiency in speaking and writing German; History 39–40 or the equivalent; six semester hours in Philosophy selected with the approval of the adviser. Majors in German are strongly advised to study French.

*Master of Arts in Germanic Languages and Literatures (Columbian College)*—Prerequisite: a Bachelor of Arts degree with a major in Germanic Languages and Literatures from this University, or the equivalent.

Required: the general requirements as stated on page 87–91; a reading knowledge of French. The thirty hours of required work must include a thesis in the field of German literature or linguistics.

*Bachelor of Arts in Education with a teaching field in German (School of Education)*—Prerequisite: the Education curriculum, page 98.

Required: the German option, page 166 and the professional courses listed on pages 169–70.

### FIRST GROUP

#### 1-2 *First-year German* (3-3)

The Staff

A year course; credit is not given for the first half until the second half is completed.

*First half:* fall—morning and evening; spring—morning; summer 1957.

*Second half:* fall—morning; spring—morning and evening; summer 1957.

The journals of German literature (translation of copy press).

#### 3-4 *Second-year German* (3-3)

The Staff

A year course; credit is not given for the first half until the second half is completed.

*First half:* fall—morning and evening; spring—morning; summer 1957.

*Second half:* spring—morning and evening; summer 1957.

Selections from modern German prose; review of grammar. Prerequisite: German 1-2 or two years of high school German.

#### 9-10 *German Conversation and Composition* (3-3)

Rogers

Academic year—morning.



49 *German Readings for Non-major Students* (3) Legner

Fall—Saturday morning; spring—evening; summer 1957.

Primarily for graduate students preparing for reading examinations. Undergraduates admitted with permission of the instructor. No academic credit for graduate students.

51-52 *Introduction to German Literature* (3-3) Legner, Rogers

Academic year—morning.

Prerequisite: German 4 or the equivalent.

## SECOND GROUP

123-4 *Goethe's "Faust"—Parts I and II* (3-3)

1958-59 and alternate years.

128 *German Literature from the Beginning to the Age of Enlightenment* (3)

1958-59 and alternate years.

131-32 *German Literature of the Eighteenth Century* Rogers (3-3)

1957-58 and alternate years; academic year—evening.

The age of Lessing, Goethe, and Schiller.

141-42 *German Literature of the Nineteenth Century* King (3-3)

1957-58 and alternate years; academic year—Saturday morning.

Romanticism, realism, and naturalism.

151-52 *Twentieth Century German Drama and Fiction* (3-3)

1958-59 and alternate years.

179-80 *Advanced Composition for Undergraduates and Graduate Masters* (1-1)

Academic year—as arranged.

## THIRD GROUP

201-2 *Middle High German* (3-3) Leaver

1957-58 and alternate years; academic year—evening.

299-300 *Thesis* (3-3) The Staff

## HISTORY

Elmer Louis Kayser, Ph.D., LL.D., *Professor of European History*  
 Wood Gray, Ph.D., *Professor of American History*  
 Howard Maxwell Merriman, Ph.D., *Professor of American Diplomatic History, Executive Officer*  
 Myron Law Koenig, Ph.D., *Professor of American History*  
 Roderic Hollett Davison, Ph.D., *Professor of European History*  
 William Columbus Davis, Ph.D., *Associate Professor of Latin American History*  
 \*Ronald Bettes Thompson, Ph.D., *Associate Professor of European History*  
 Richard Catlin Haskett, Ph.D., *Associate Professor of American History*

*Bachelor of Arts with a major in History (Columbian College—Field of Study).—Prerequisite:* the Arts and Letters curriculum in the Junior College, see page 60. *European and Latin American History* 32, 41 and 71-72.

Required: the general requirements as stated on pages 82-86 and the grade of "pass" on the History major examination at the end of the senior year.

The major consists in the study of the rise, development, and spread, and the continuing challenges of Western civilization, is attained by a major examination. Under the guidance of an advisor the student will arrange his program in History to attain a balanced coverage of (1) the rise of civilization in Europe to the eve of the French Revolution, (2) the spread of Western culture throughout the world since the close of the fifteenth century, (3) the basic problems of modern industrial civilization from the beginnings of the Industrial Revolution, and (4) the relations of the major nations of Europe and America in three world settings since the Napoleonic Wars. A six-hour research seminar to give training in fundamental technique is a required part of each major's program, and a symposium (History 197-98) is offered as a means of integrating the student's understanding of the continuity of Western civilization. For details relating to the organization and content of the major, see the pamphlet on this subject, which is available in the office of the Dean of Columbian College and the Executive Office of the History Department.

*Bachelor of Arts with a major in Latin American Civilization (Columbian College—Field of Study).—Prerequisite:* the Arts and Letters curriculum in the Junior College, see page 60.

Required: the general requirements as stated on pages 82-86 and the grade of "pass" on the Latin American Civilization major examination at the end of the senior year. The coordinated field of knowledge upon which the student will be examined includes political and social history, economic development, governmental structures and international relations, and the principal literary works and writers of the Latin American republics. The Department of History provides a symposium (History 197-98) intended to assist the student in preparing himself for the major examination. For further details, see the pamphlet, which is available in the Office of the Dean of Columbian College.

*Master of Arts in the field of History (Columbian College).—Prerequisite:* the

\* The additional course spring semester 1977-78.

degree of Bachelor of Arts with a major in History from this University, or the equivalent, and the approval of the Department.

Required: the general requirements for the degree, as stated on pages 87-91. Of the twenty-four semester hours of required second- and third-group courses (exclusive of the thesis), at least six must be in the 4-group history courses; a maximum of six may be in a closely related field outside the Department of History as approved by the Department. Master's candidates are responsible for arranging with instructors of second-group courses for extra work, in order to receive graduate credit for such courses.

*Master of Arts in the field of Latin American Civilization (Columbia College).*—Prerequisite: the degree of Bachelor of Arts with a major in Latin American Civilization from this University, or the equivalent, and the approval of the Committee on Latin American Civilization.

Required: the general requirements for the degree, as stated on pages 87-91. Course work and the comprehensive examinations will embrace political and social history, governmental structures and international relations, economic development, and principal literary works of Latin America. The thesis may be written in any one of these four fields. All courses must be approved in advance by the Advisor.

*Doctor of Philosophy (Graduate Council).*—See page 91.

*Bachelor of Arts in Education with a teaching field in History (School of Education).*—Prerequisite: the Education curriculum, page 78.

Required: the History option, page 107, and the professional courses listed on Pages 169-72.

#### FIRST GROUP

- 39-40 *The Development of European Civilization (3-5)* Kayser, Davison, Thompson

Academic year—morning and evening; summer 1957

Primarily for freshmen. *First half:* the political, social, economic, and cultural history of the Old World from ancient times to 1715. *Second half:* from 1715 to the present.

- 71-72 *The Development of the Civilization of the United States (3-3)* Koenig, Haskell

Academic year—morning and evening; summer 1957

Primarily for sophomores. *First half:* the political, social, economic, and cultural history of the United States in their world setting from 1492 to 1875. *Second half:* from 1875 to the present.

#### SECOND GROUP \*

- 109 *Thought and Culture of the Western World I. Ancient Civilization (3)* Kayser

1958-59 and alternate years.

Intellectual and social awakenings in the Near East, Greece, and Rome; classical art, letters, philosophy, and science.

\* History 109-110 is prerequisite to courses 129 through 131 and 141 through 143. History 71-72, to courses 171 through 174; either History 39-40 or 71-72, to courses 161 through 163.



- 110 *Thought and Culture of the Western World II: the Middle Ages and Renaissance* (3) Kayser  
1958-59 and alternate years  
Christian thought from Augustine to Thomas Aquinas; humanism and the classical revival, rise of vernacular literatures, the fine arts.
- 119 *Thought and Culture of the Western World III: from the Reformation through the Age of Reason* (3) Kayser  
1957-58 and alternate years, fall—morning  
The growth of Protestant policy and doctrine; the Counter Reformation; the scientific revival, rationalism and the enlightenment; arts and letters.
- 120 *Thought and Culture of the Western World IV: Intellectual Aspects of the Modern Age* (3) Kayser  
1957-58 and alternate years, spring—morning  
The evolution of democratic and social concepts, liberalism and its variations in culture and in politics, the impact of modern science and technology, romanticism and realism.
- 130 *Nationalism* (3) Kayser  
Summer 1957.  
The historical evolution of modern nationalism.
- 144 *Modern Germany* (3) Thompson  
Summer 1957.  
German politics and culture as a living force in the modern world 1740-1945.
- 145-46 *Russian History* (3-3) Thompson, ———  
Academic year—morning  
*First half:* Russia and Eastern Europe 800-1900, with emphasis on the 19th century. *Second half:* 20th century Russia in its liberal, revolutionary, and totalitarian phases.
- 147 *Economic History of Europe* (3) Gray  
Fall—evening  
A survey from ancient times to the present day.
- 148 *Oversea Expansion of Europe* (3) Keeling  
Fall—morning  
International rivalries and the impact of European civilization in Africa and the Pacific from 1500, with emphasis on the eighteenth and nineteenth centuries.



- 149-50 *European Diplomatic History* (3-3) Davison  
Academic year—evening.  
Background of the European state system and of diplomatic practices and relations since the Congress of Vienna, with emphasis on the policies and actions of the great powers and their statesmen. *First half*, to 1878; *second half*, since 1878.
- 151-52 *English History* (3-3) Koenig  
Academic year—evening.  
A general survey of the development of political, social, and economic institutions of lasting significance in the English-speaking world. *First half*, to 1689; *second half*, since 1689.
- 161 *Ancient Americans* (3) Davis  
1957-58 and alternate years—fall—morning, summer 1957.  
A study of the Maya, Aztec, Inca, and the other early civilizations of North and South America.
- 162 *Iberian Background of Latin America* (3) Davis  
1957-58 and alternate years—spring—evening.  
History of Spain and Portugal, with emphasis on developments leading to the rise and decline of the Spanish and Portuguese empires.
- 163 *Latin American History: Colonial Period* (3) Davis  
Fall—morning.  
Political, economic, social, and institutional developments in Spanish and Portuguese America from the conquest through the wars of independence.
- 164 *South America since Independence* (3) Davis  
1958-59 and alternate years.  
Development of the independent South American states in the 19th and 20th centuries.
- 166 *Mexico and the Caribbean since Independence* (3) Davis  
1957-58 and alternate years—spring—morning.  
A survey of the republics of Mexico, Central America, and the Caribbean Islands.
- 171-72 *Social History of the United States* (3-3) Coffey  
Academic year—morning, summer 1957—History 471-131.  
Daily life, institutions, intellectual and artistic achievements of the Agrarian Era, 1607-1861, and the Urban-Industrial Era, 1861 to the present time.

- 173 *Representative Americans* (3) Gray  
Spring—morning; summer 1957.  
A biographical approach to national history. Some fifty significant and pivotal personalities in the development of the United States in government, business, science, religion, journalism, the arts, and social reform.
- 174 *Economic History of the United States* (3) Gray  
Spring—evening.  
Main trends in the development of American agriculture, industry, and trade since 1607, with emphasis on tendencies and problems since the Civil War.
- 175-76 *Political and Constitutional History of the United States* (3-3) Haskett  
Academic year—evening; summer 1957—History 176 (3)  
The programs and conflicts of group interests in America within the political and legal framework. *First half*: to the eve of the Civil War. *Second half*: the Civil War to 1945.
- 177 *The South* (3) Gray  
Fall—morning.  
Rise of the plantation system and slavery, the intersectional conflict, and the problems and progress of the New South.
- 178 *The West* (3) Koenig  
Spring—morning.  
The role of the frontier in American history.
- 181-82 *Diplomatic History of the United States* (3-3) Merriman  
Academic year—morning and evening; summer 1957—History 182 (3).  
Tendencies toward isolation, expansion, and collectivism; disputes with foreign countries and their settlement; and the activities of the American secretaries of state and diplomatic agents. *First half*: to 1871. *Second half*: since 1871.
- 183 *Overseas Expansion of the United States* (3) Merriman  
Summer 1957.  
The political, economic, social, and cultural life of our outlying possessions.
- 184 *Canada and the United States* (3) Merriman  
Not offered 1957-58.  
The historical background and main trends in the relationship of the two English-speaking peoples of North America.

- 191-92 *Current History* (1-1) Kayser  
Academic year—afternoon.  
Contemporary events in their world setting.
- 193 *History of the Near East* (3) Davison  
Fall—morning.  
The Hittite, Arab, Persian, and Islamic backgrounds of Near Eastern history; the rise and decline of the Ottoman Empire; the decline of European power in the area; and the Ottoman breakup into the Turkish Republic and other successor states.
- 195-96 *History of the Far East* (3-3) Thompson  
Not offered 1957-58.  
First half: the civilizations of China, India, and Japan from the beginnings to 1500 A.D. Second half: the modern Orient under the impact of the West since 1500.
- 197-98 *Prerequisite Seminar in Latin American Civilization* (3-3) Davis, Wythe, Robb  
Academic year—as arranged.  
Reading course for coordination and review. Open only to majors in Latin American Civilization.
- 199-200 *Prerequisite Reading for the History Major* (3-3) The Staff  
Academic year—evening, summer 1957.  
Limited to majors in History. Readings and discussions in twin groups in the history of Western civilization, including representative selections from the classics of historical literature.

## THIRD GROUP\*

- 241-42 *Conference Seminar in Recent European Diplomatic History*† (3-3)  
Not offered 1957-58.
- 244 *Reading Course in Modern European History* (3) Davison  
Spring—as arranged.  
Primarily for graduate students.
- 246 *Seminar in Russian and Far Eastern History* (3) Thompson  
Not offered 1957-58.

\* Approval of the instructor is required for registration in each third group course.

† Primarily for Masters candidates in the School of Government.



- 247 *Reading Course in Russian and Far Eastern History* (3) Thompson  
Not offered 1957-58  
Primarily for graduate students
- 249 *Seminar in European Diplomatic History* (3) Davison  
Fall—afternoon.
- 261-62 *Seminar in Latin American History* (3-3) Davis  
1958-59 and alternate years
- 271-72 *Seminar in the Social History of the United States* (3-3) Gray  
Academic year—evening
- 275-76 *Seminar in American Political and Constitutional History* (3-3) Haskett  
Academic year—evening.
- 281-82 *Seminar in the Diplomatic History of the United States* (3-3) Merriman  
Academic year—afternoon.
- 287 *Conference Seminar on the Development of the Foreign Policy of the United States*\* (3)  
Not offered 1957-58
- 291-92 *Seminar* (3-3) The Staff  
Academic year—as arranged, summer 1957.  
Prerequisite: approval of the Department.
- 294 *Seminar in the History of the Modern Near East* (3) Davison  
Spring—evening
- 297-300 *Thesis* (3-3) The Staff  
Academic year—as arranged, summer 1957  
Required of all candidates for the Master's degree specializing in history.

\* Primarily for Master's candidates in the School of Government.



## HOME ECONOMICS

Frances Kirkpatrick, A.M., *Professor of Home Economics, Executive Officer*

Kathryn Mildred Towne, A.M., *Professor of Home Economics*

*Bachelor of Science with a major in Home Economics (School of Education)* — Prerequisite: the Home Economics curriculum in the Junior College, see page 69. The requirements for the degree are stated on pages 171-172 and 173.

*Bachelor of Arts in Education with a teaching field in Home Economics (School of Education)* — Prerequisite: the Education curriculum on page 78. For requirements, see special bulletin on Home Economics.

### FIRST GROUP

- 1 *Food Selection and Preparation* (3) Kirkpatrick  
Fall—morning.  
Composition, selection, and preparation of food; analysis of recipes, standard products; planning, preparing, serving, and estimating the cost of meals. Material fee, \$18.
- 22 *Clothing: Its Selection, Cost, and Care* (3) Towne  
Spring—morning.  
Clothing selection—the economic, aesthetic, and hygienic aspects; the application of the principles of color and design to individual selection; the care of clothing.
- 51 *Family Meals* (3) Kirkpatrick  
Spring—morning.  
The choice, purchase, preparation, and service of foods; dietary standards, food habits, and the nutritional needs of the family; problems of purchasing, care, and use of food by the consumer. Material fee, \$11.
- 53 *Family Health and Household Sanitation* (3) Kirkpatrick  
Fall—evening.  
Home hygiene and home care of the sick; the principles of household sanitation in relation to health and diseases.
- 62 *Clothing Construction* (3) Towne  
Spring—afternoon.  
Simplified techniques and unit method of construction suitable for cotton, wool, silk, and man-made fibers; the use of commercial patterns and their alteration; the proper selection of color, design, and fabric. Material fee, \$8.

- 71 *Costume Design and Fashion Economics* (3) Towne  
Fall—afternoon, spring—evening.  
Factors determining fashions and effect on cost of clothing; problems of the consumer of textiles and clothing; historic costume and its relation to modern dress. Material fee, \$8.
- 72 *Household Textiles* (3) Towne  
Fall—morning.  
Presentation, uses, and tests of the different textile fibers and fabrics; and development of judgment and knowledge of standards for the consumer of clothing and home furnishing material. Material fee, \$8.
- 77 *Marketing* (3)  
Not offered 1957-58.  
Purchasing of foods as it relates to the home and to the institution.

## SECOND GROUP

- 102 *Advanced Food Preparation* (3) Kirkpatrick  
Spring—evening.  
The application of the fundamental processes of food preparation to a wider range of food materials and various services for different occasions. Material fee, \$18.
- 106 *Quantity Cookery* (3) The Staff  
Not offered 1957-58.
- 123 *Household Finance and Problems of the Consumer* (3) Towne  
Fall—morning.  
Economic problems of the family in modern industrial society; family income, income apportionment and household expenditures; laws affecting the home; investments; consumer buying.
- 143 *Advanced Clothing Construction* (3) Towne  
Fall—afternoon.  
Problems of clothing construction and flat pattern designing. Material fee, \$8.
- 148 *Food Problems and Demonstration Methods* (3) Kirkpatrick  
Fall—morning.  
Factors affecting the preparation of standard products from the experimental viewpoint; principles of demonstration. Material fee, \$18.

- 152 *Nutrition* (3) Kirkpatrick  
Spring—morning  
Lecture course on the principles of normal and abnormal human nutrition. Laboratory work on the calculation and preparation of dietaries.  
Laboratory fee, \$8.
- 154 *Diet Therapy* (3)  
Not offered 1957-58.  
Study of nutrition as applied to diet and disease. Material fee, \$8.
- 164 *Child Nutrition* (3) Kirkpatrick  
Not offered 1957-58.  
Basic principles in nutrition and growth of the infant, pre-school, and adolescent child in health and disease.
- 168 *Institutional Management* (3)  
Not offered 1957-58.  
Study of the organization, equipment, and marketing problems of institutions.
- 171 *House Furnishing* (3) Towne  
Fall—evening  
Home planning from the historic, artistic, economic, and esthetic viewpoints; home furnishings such as chairs, dishes, floor covering, mattresses, etc. Material fee, \$8.
- 181 *The Child in the Home* (3) Kirkpatrick  
Spring—afternoon  
Care and development of children; parent-child relationships.
- 192 *The Home: Its Management and Equipment* (3) Kirkpatrick  
Not offered 1957-58.  
Economic management of the home; distribution of time and money; problems in the selection, arrangement, and care of equipment.
- 193 *Supervision of Home Management* (3) The Staff  
Fall—as arranged  
Field work under supervision. Designed to meet requirements of those preparing to teach in federally aided schools.

195-96 *Special Problems* (3-3)

The Staff

Academic year—morning.

Individual investigation or study under the guidance of a member of the Staff. *First half:* such problems as marketing, draping, and fabric decorations. *Second half:* problems of tailoring.

197-98 *Proseminar* (3-3)

The Staff

Academic year—evening.

The study of the most recent materials and problems in the various phases of home economics.



## JOURNALISM

Ross Pelton Schlabach, Jr., M.S., *Professor of Journalism, Executive Officer*

Robert Crumpton Willson, A.B., *Assistant Professor of Journalism*

Frank Landt Dennis, A.B., LL.B., *Lecturer in Journalism*

William Vance Nessly, *Lecturer in Journalism*

John Vincent Hinkel, M.S., *Lecturer in Journalism (Public Relations)*

Kip Ross, *Lecturer in Journalism*

Howard Lee Coppenbarger, *Lecturer in Journalism*

Jack Eisen, A.B., *Lecturer in Journalism*

Coit Taylor Hendley, Jr., A.B., *Lecturer in Journalism*

Louis Robinson, A.B., *Lecturer in Journalism*

Louis Ray Stockstill, A.B., *Lecturer in Journalism*

### SPECIAL LECTURERS

Richard Hollander, Managing Editor, *The Washington Daily News*

James Russell Wiggins, Executive Editor, *The Washington Post and Times Herald*

*Bachelor of Arts with a major in Journalism (Columbian College—Departmental)*

*In the field of News-Editorial*—Prerequisite: the Arts and Letters curriculum in the Junior College, including Journalism 71-72 and 81-82, see page 92. It is recommended that electives in the Junior College be selected from the following: Economics 1-2, English 71-72, History 71-72, Political Science 7-10, Psychology 1, Sociology 1-2, and Speech 1 and 2, 11, or 12.

*Required:* the general requirements as stated on pages 80-86. Of the sixty hours of required courses in Columbian College a minimum of eighteen must be in news-editorial Journalism courses including 113, 117 or 117, 141, and 148. It is recommended that electives in Columbian College be selected from the following: Business Administration 147, English 171-72, 177-78, Geography 145, History 171-72, 177-78, Psychology 147, 148, 151, 152, and Speech 141.

*In the field of Public Relations*—Prerequisite: the Arts and Letters curriculum in the Junior College, see page 92. Electives should include Economics 1-2, English 11, History 71-72, Journalism 71-72, 81-82, Psychology 1, 2, and Speech 1, 2, or 11, or 12.

*Required:* the general requirements as stated on pages 80-86. The sixty hours of required courses in Columbian College must include the following: Journalism 141 or 144, 143, 145, 146, and such courses in Business Administration, English, History, Psychology, and Speech, as are selected upon the advice of the Journalism Department. It is recommended that Columbian College electives be selected from the following: Business Administration 131, 132, 133, 134, 139, 141, 143, 147, 149, History 171-72, 174, Journalism 142, 151, Psychology 144, 145, 151, 152, Public Administration 201, Speech 141, 143. In exceptional cases changes from the required and recommended courses may be permitted with the approval of the Journalism Department.

## FIRST GROUP

71-72 *Survey of American Journalism* (3-3) Sallabath

Academic year—morning and evening.

Journalism 71: the newspaper's position in relation to political, social, and economic life, as a public institution and as a private business, including techniques of gathering and presenting news, and of forming opinion, and their effects. Journalism 72: development of journalism from colonial days to the present and their relations to social, literary, economic, and political history.

81-82 *Reporting* (3-3) Eisen, Copenhagen

Academic year—morning and evening.

Techniques of newspaper reporting, instruction and practice in modern methods of gathering and presenting news. Some knowledge of typewriting is desirable. Prerequisite: English 1 or the equivalent. Laboratory fee, \$7 a semester.

## SECOND GROUP

115 *Newspaper Copy Editing and Make-up* (3) Nessly

Fall—Saturday morning.

Value of news and its publication, the copy desk, headlines, galleys, the city editor and his functions. Prerequisite: Journalism 81-82 or the equivalent, unless taken concurrently.

121-22 *Feature Writing* (3-3) Willson

*First half:* fall—morning; spring—evening. *Second half:* not offered 1947-48.

Instruction and practice in writing of special newspaper and magazine articles for sale, material for which is obtained through observation and independent investigation. Prerequisite: English 1, 2 or the equivalent.

133 *City News Reporting* (3) Hendley

Fall—evening.

Training and practice in coverage and presentation of local news. Prerequisite: Journalism 81-82.

137 *Reporting of National Affairs* (3) Stockstill

Spring—afternoon.

Training in the coverage and presentation of national news with special attention to Washington correspondence and press association reporting.

140 *Pictorial Journalism* (3) Ross

Fall—evening.

Photographic techniques affecting publication, the illustration and the story angle, standards of judgment in selection and use of good pic-

- tures, captions, and editing techniques, cropping for effective reproduction.
- 142 *Retail Newspaper Advertising* (3) Robinson  
Spring—evening.  
Retail newspaper advertising management, coordination of newspaper advertising with retail sales patterns, advertising readership, copy preparation, production methods.
- 143 *Industrial Communications* (3) Willson  
Fall—evening.  
An introduction to the field of corporate journalism. Writing and editing the company magazine. Preparation of annual reports. Editing stockholder publications and external house organs. The preparation of brochures, manuals, news and training aids, catalogues, and literature.
- 144 *Business Journalism* (3) Willson  
Spring—Saturday morning.  
An introduction to the functions and activities of the business paper publisher's industry. Writing for the business press. Reporting the news of business and industry, finance, advertising, and marketing.
- 145 *Principles of Public Relations* (3) Hinkel  
Fall—Saturday morning.  
The press and information office, technique of news releases, public relations as news, preparation of feature material, the problem of public relations in government agencies and commercial establishments.
- 146 *Problems in Public Relations* (3) Hinkel  
Spring—Saturday morning.  
Case histories of successful public relations programs, discussion of public relations procedures and ethics, preparation of specific public relations projects. Prerequisite: Journalism 145.
- 151 *Editorial Writing* (2 or 3) Schlabach  
Fall (3)—evening; spring (2)—morning.  
Current events from the standpoint of editorial interpretation, instruction and practice in the writing of columns and columns on public affairs. It is recommended that History 191 or 192 be taken concurrently with this course.
- 198 *Law of the Press* (3) Dennis  
Spring—evening.  
Freedom of the press, censorship, legislative controls, publications as contempt of court, copyright, news gathering agencies, labor law and the newspaper business, law of libel, privileged matter, fair comment on public characters, right of privacy.



## LAW

Charles Sager Collier, A.B., LL.B., S.J.D., *Professor Emeritus of Law in Residence*

- 
- \*William Thomas Frver, A.B., LL.B., J.D., *Professor of Law*  
 Carville Dickinson, Benson, A.B., LL.B., S.J.D., *Professor of Law*  
 James Forrester Davison, A.B., LL.B., LL.M., S.J.D., *Professor of Law*  
 James Oliver Murdock, Ph.B., LL.B., *Professor of Law*  
 Oswald Symister Colclough, B.S., LL.B., LL.D., *Professor of Law*  
 Herman Israel Orentlicher, A.B., LL.B., *Professor of Law*  
 Leroy Sorenson Merrifield, A.B., LL.B., M.P.A., S.J.D., *Professor of Law*  
 Orville Hassler Walburn, A.B., LL.B., J.D., *Professor of Law*  
 James Robert Kirkland, A.B., LL.B., LL.M., *Adjunct Professor of Law*  
 John Wingfield Jackson, B.S., LL.B., *Adjunct Professor of Law*  
 Frank Hammett Myers, LL.B., LL.M., *Adjunct Professor of Law*  
 John Theodore Fey, LL.B., M.B.A., J.S.D., *Professorial Lecturer in Law*  
 John Albert McIntire, A.B., LL.B., LL.D., *Professorial Lecturer in Law*  
 Justin Lincoln Edgerton, A.B., LL.B., *Professorial Lecturer in Law*  
 Philip Field Herri-k, A.B., LL.B., LL.M., *Professorial Lecturer in Law*  
 George Edward Monk, A.B., LL.B., LL.M., *Professorial Lecturer in Law*  
 Charles James Zinn, A.B., LL.B., LL.M., S.J.D., *Professorial Lecturer in Law*  
 Joseph Dach, LL.D., LL.B., *Professorial Lecturer in Law*  
 Louis James Harris, A.B., LL.B., S.J.D., LL.M., *Professorial Lecturer in Law*  
 John Joseph Czyzak, A.M., LL.B., *Professorial Lecturer in Law*  
 Leonard Patrick Walsh, A.B., LL.B., *Professorial Lecturer in Law*  
 Robert McKinney Cooper, Ph.M., J.D., *Associate Professor of Law*  
 John Patrick Burke, A.B., LL.B., *Associate Professor of Law*  
 †David Benson Weaver, A.B., LL.B., *Associate Professor of Law*  
 Louis Harkey Mayo, B.S., LL.B., J.S.D., *Associate Professor of Law*  
 Glen Earl Weston, B.S., LL.B., *Associate Professor of Law*  
 Joseph Patrick Driscoll, A.B., LL.B., *Associate Professor of Law*  
 ‡William Thomas Mallison, Jr., A.B., LL.B., *Associate Professor of Law*

\* On sabbatical leave fall semester 1957-58

† On sabbatical leave 1957-58

‡ On leave of absence fall semester 1957-58



- Robert Galloway Dixon, Jr., Ph.D., LL.B., *Associate Professor of Law*  
 Crombie James Dickinson Garrett, A.B., LL.B., *Lecturer in Law*  
 Milton Paul Kroll, A.B., LL.B., *Lecturer in Law*  
 Eugene William Geniesse, B.S.E., M.S., LL.B., *Lecturer in Law*  
 William Wolcott Goodrich, LL.B., *Lecturer in Law*  
 Vincent Kleinfeld, LL.B., *Lecturer in Law*  
 Paul Archibald Rose, LL.B., *Lecturer in Law*  
 Herbert Joseph Liebesny, J.D., *Lecturer in Law*  
 Carl Clell Davis, B.S., LL.B., LL.M., *Lecturer in Law*  
 Thomas Hayward Brown, *Lecturer in Law*  
 George Nelson Robillard, B.S., LL.B., *Lecturer in Law*  
 John Alexander Kendrick, A.B., LL.B., *Clerk of the Trial Practice Court*  
 Dudley Graham Skinker, LL.B., *Associate Clerk of the Trial Practice Court*

For the requirements for the degrees of *Bachelor of Laws*, *Juris Doctor*, *Master of Laws*, *Master of Comparative Law*, *Master of Comparative Law (American Practice)*, and *Doctor of Juridical Science*, see pages 124-27, 128-31.

### FIRST YEAR

#### 100 *Agency* (2)

Cooper

Fall—evening; spring—morning

Master and servant (status of agent), test of last sentence, nature of agency relation, actual authority, parties (disclosed and undisclosed agent), unauthorized transactions, torts, tortfeasors.

#### 110 *Constitutional Law* (4)

Collier, Mallison, Dixon

Spring—morning and evening

Historical introduction, judicial approach and methods, doctrine of the separation of powers, powers of the National Government, the federal system, and relation of federal and state courts.

#### 115-16 *Contracts I, II* (4-2)

Mayo

Academic year—morning and evening; summer 1957.

Scope of protection accorded contracts; specific performance of contracts other than land transactions; damages, restitution. Mutual assent, offer and acceptance, nonunderstanding, mistake, reformation, part exchange rule. Consideration (third party beneficiaries, assignments, conditions, Statute of Frauds).

#### 125 *Criminal Law and Procedure* (4)

Manlock, Cooper

Spring—morning and evening; summer 1957.

Origin and purposes of criminal law; elements of criminal liability; mental disorders; solicitation, attempt, and conspiracy; crimes against

the person, against property, and against both), statutory provisions, criminal procedure, with consideration of Federal Rules of Criminal Procedure.

- 135 *Legal Method and Legal System* (4) Benson, Davidson, Merrifield, Walburn, Burke

Fall—morning and evening; spring—morning and evening; summer 1957

Introduction to substantive and procedural law dealing with basic concepts, training in method and technique of case law and legal research, modern and medieval sources in use at law today and the legal system; importance of language in law; legal reasoning and use of arguments under doctrine of stare decisis; law of the case, and judgments; development of Anglo-American legal system; comparison of judiciary and bar, stressing enforcement of ethical standards.

- 145 *Personal Property* (2) Dixon

Fall—morning and evening; spring—morning and evening; summer 1957

Concepts of property, including interests created by bailments, liens, and pledges; methods of acquiring ownership.

- 150 *Real Property* (2) Benson

Fall—evening; spring—morning; summer 1957

Historical background of the law of estates and conveyances, present-day estates, concurrent estates.

- 160 *Torts* (4) Merrifield, Walburn, Garrett

Fall—morning; spring—evening

Liability for harm to persons or tangible things, defamation and invasion of privacy.

#### SECOND YEAR

- 200 *Administrative Law* (4) Davison

Spring—morning and evening; summer 1957

The position of the administrative process in the separation of powers, including the status of administrative personnel, administrative law, legal nature of administrative action, decisions and rule-making—particularly as relating to federal administrative actions.

- 205 *Brief Writing and Oral Argument* (2) Burke

Fall—evening

Exposition and study of the basic techniques of written and oral legal argumentation. Each student will be required to write, as a sample paper, a brief presenting contentions based on the actual record in an unopposed case.

- 210 *Business Associations* (4) \_\_\_\_\_  
 Spring—morning and evening; summer 1937.  
 Contrast of the partnership and corporation as alternative forms of organization; comparing partnership and corporation—properties, capital contributions, their structural problems of operation, relations between partners; laws of dissolution, partners, officers, control, assets, distribution to owners, voluntary reorganization, conversion, and termination.
- 215 *Civil Procedure* (4) Walburn, Burke  
 Fall—morning and evening; summer 1937.  
 Procedure, discovery, remedies, forms of trial and related post-trial issues. Emphasis is on Federal Rules of Civil Procedure and other modern codes.
- 216 *Commercial Paper* (4) Orentlicher  
 Fall—morning and evening; summer 1937.  
 Bills of exchange, promissory notes and checks, especially under the Negotiable Instruments Law.
- 224 *Commercial Transactions* (4) Orentlicher  
 Spring—morning and evening.  
 The law relating to the sale and distribution of goods, and to the security interests therein utilized in this connection, with particular attention to the effect of uniform laws.
- 230 *Conspiracies* (2) Walburn  
 Spring—morning and evening.  
 Land contracts; conspiracy, smuggling; customs, profits, overcharges, and various provisions, among governing and adverse laws.
- 235 *Domestic Relations* (2) \_\_\_\_\_  
 Fall—morning and evening; summer 1937.  
 Marriage, separation, and divorce; adoption and custody of children; testamentary relations.
- 240 *Law of Torts* (4) Fryer  
 Spring—morning and evening; summer 1937.  
 Functions of court and jury, qualifications and exclusion of witnesses; evidence, relevancy, and material evidence; use of writings; substance of the tortious rule.



- 243 *Federal Jurisdiction* (2) Cooper  
 Fall—morning and evening.  
 Constitutional and statutory origins of federal courts, cases arising under the laws and the Constitution, diversity of citizenship, jurisdictional amount, removal procedure and jurisdiction, limitations on federal jurisdiction, state and federal conflicts, substantive law applied by federal courts.
- 248 *Future Interests* (2) Benson  
 Fall—evening; spring—morning.  
 Future interests at common law and under modern statutes, construction of limitations, powers of appointment, rule against perpetuities.
- 251 *Insurance* (2) \_\_\_\_\_  
 Fall—evening.  
 The insurance device in life, property, and other risks.
- 254 *International Law* (4) Murdock, Mallison  
 Fall—evening, spring—morning.  
 The state system. General survey of rights and duties of treaty law of war and peace, including nationality law, international crimes, treaty settlement of disputes, treaties, United Nations and World Court, sources of international law.
- 259 *Labor Law* (4) Merrifield  
 Spring—morning and evening.  
 Law governing labor-management relations, organization and representation of employees, regulation of armaments, enforcement of collective bargaining agreements, international and foreign relations.
- 265 *Legal Accounting* (2) Driscoll  
 Fall—morning and evening.  
 A study of elementary accounting principles and techniques; application of accounting principles to legal problems.
- 270 *Legislation* (2) \_\_\_\_\_  
 Fall—evening, summer 1957.  
 The legislative process, with particular emphasis on its operation in federal and state governments, legislative organization and procedure; statutory interpretation.



- 274 *Taxation—Federal Estate and Gift* (2) Driscoll  
Fall—morning and evening.  
Specific problems in federal estate and gift taxation, with consideration of relevant state inheritance tax problems.
- 279 *Taxation—Federal Income* (4) Fey, Driscoll  
Fall—evening; spring—morning.  
A study of the federal income tax, including construction of statutes, practice and procedure, and legislative policy.
- 285 *Trusts and Estates* (4) \_\_\_\_\_  
Fall—morning and evening.  
Formalities of execution of wills; problems of construction, revocation, contest, limits on testamentary power, intestate succession. Creation of trusts, inter vivos and testamentary; administration of decedents' estates and trust estates.
- 295 *Unfair Trade Practices* (4) Weston  
Fall—morning and evening.  
Unfair trade practices at common law and under statutes; trade-marks, trade names; copyright law; misappropriation of ideas, protection of competitors and consumers against false advertising under Federal Trade Commission Act; resale price maintenance under state Fair Trade Acts; miscellaneous business practices.

## THIRD YEAR

- 300 *Admiralty* (2) Davis  
Spring—evening.  
Federal and state jurisdiction; jurisdiction over waters, craft, contracts, torts, crimes, in maritime matters, etc.; laws applicable to maritime workers and maritime liens.
- 303 *Aviation Law* (2) \_\_\_\_\_  
Fall—evening.  
Procedure before Civil Aeronautics Board; legal problems arising in connection with air transportation and airports, international conventions and organizations.
- 307 *Comparative Law* (4) Murdock  
Fall—evening.  
The Civil Law System; general introduction to foreign law as exemplified by Roman Law and the modern French Law; comparative study of administration of justice, legal institutions, and methods for international law practice and working with foreign lawyers.

309 *Conflict of Laws* (4)

Dixon

Fall—morning and evening 2; summer 1957.

Study of cases involving foreign elements; principles of jurisdiction and limitations upon its exercise; procedure, torts, workmen's compensation, contracts, property, family law, administration of estates, business associations.

313 *Constitutional Interpretations* (2)

1958-59 and alternate years.

Advanced course in constitutional law. The Constitution and constitutional tradition; doctrines of limited government, separation of powers, and judicial review; executive power and limitations of "discretion" in current constitutional developments. Introduction to comparative constitutional law, with studies in the constitutional law of selected states of the Union.

318 *Creditors' Rights* (4)

Summer 1957.

Remedies of unsecured creditors; judgments, fraudulent conveyances, creditors' agreements, equity and statutory recoupment, and bankruptcy. The general approach is that of law administration.

321-22 *Current Decisions* (2-2)

Weston

Academic year—morning and evening.

Reserved for, and limited to, members of the student staff of the Law Practice.

330 *Federal Anti-Trust Laws* (4)

Weston

Spring—evening.

Restraints of trade at common law and under Sherman Anti-Trust Act of 1890, Federal Trade Commission and Clayton Acts by monopoly, price-fixing agreements, trade associations, exclusive dealing agreements, tying sales, and trade boycotts; patents and copyrights under anti-trust laws.

335 *Jurisprudence* (2)

Collier

Fall—morning; spring—evening.

History of jurisprudence; schools of jurists, particularly the nineteenth century schools; sociological jurisprudence; theories of justice; the nature of law; law and morals; law and the state; the scope and subject matter of law; sources and forms of law; the traditional elements; analysis of general legal concepts.

- 339 *Labor Arbitration* (2) Merrifield  
1957-58 and alternate years: spring—evening.  
Labor arbitration and collective bargaining; role of the lawyer in negotiation and administration of collective labor agreements; practices, procedures, and substantive issues in labor arbitration.
- 341 *Labor Standards and Social Security Legislation* (2) Merrifield  
1958-59 and alternate years  
Legal problems arising under federal and state statutes dealing with labor standards and social security. Particular emphasis is placed upon the regulation of wages and hours, workmen's compensation, and insurance against unemployment and old age.
- 345 *Legislative Drafting* (2) Zinn  
Fall—evening.  
Advanced instruction and practice in legislative drafting.
- 349 *Local Government Law* (2) ———  
Fall—evening  
Types and objectives of city, county, and local governmental units; intergovernmental relations; regional organization and changes; local lawmaking; community planning and development.
- 355 *Mortgages* (2) Orentlicher  
1958-59 and alternate years; summer 1957.  
Security interests in real property, their creation, transfer, enforcement, and extinguishment.
- 359 *Patent Law I\** (2) Robillard  
Fall—evening.  
Origin and nature of patents, trade-marks and copyrights; patentability, amendment and correction of patents; conditions precedent to grant of patents.
- 360 *Patent Law II* (2) Harris  
Spring—evening.  
Licensing and protection of patents; government ownership; protection of patent rights abroad; economic and social functions of patents.
- 362 *Patent Office Practice\** (2) Rose  
Spring—evening.  
Rules and practice, appeal and interference procedure.

\* Patent law courses should take Law 349 and Law 360 concurrently in the fall semester and Law 359 and Law 362 concurrently in the spring semester.



365-66 *Patent Trial Practice Court*\* (2-2) Geniesse, Brown

Academic year—evening

Practice before the United States Court of Customs and Patent Appeals and the federal courts. Prerequisite: forty-two semester hours, including Law 215 and 242. Law 359, which is also required, should be taken concurrently.

This course may be elected instead of Law 385-86 to satisfy the Trial Practice Court requirement.

370 *Public Utilities* (2) Fryer

1957-58 and alternate years: spring—evening.

Regulation by federal, state, and municipal authorities concerned with licensing, rates, services, and practices, with emphasis on federal regulation of interstate operations; judicial review.

376 *Restitution* (2) Burke, Orentlicher

Spring—morning and evening; summer 1957.

Remedies at law and in equity for restitution of benefits conferred, especially as based on the concept of unjust enrichment.

380 *Suretyship* (2) Orentlicher

Summer 1957.

The law of suretyship, especially in the context of Americanization (credit and commercial and financial practice, with attention also to federal and non-federal suretyship practices and the place of suretyship principles in the solution of legal problems generally.

385-86 *Trial Practice Court* (2-2) Kirkland, Edgerton, Myers, Jackson, Herrick, Monk, Walsh, Kendrick, Skinner

Academic year—morning and evening.

Try of assigned cases, trial tactics and techniques, pre-trial and post-trial procedure pursuant to Federal Rules.

To be taken in the spring year. Prerequisite: forty-two semester hours, including Law 215 and 242.

391 *World Law* (2)

Not offered 1957-58.

International organization; the legal aspects of the United Nations.

## GRADUATE COURSES

401 *Administrative Law Seminar* (2) Davison

Fall—evening.

Group study of specific problems in administrative law.

\* See footnote on page 339.



408 *Constitutional Law Seminar* (2)

Not offered 1957-58.

Group study of contemporary problems in constitutional law.

412 *Control and Use of Atomic Energy* (2)

Mayo

Fall—evening.

Various legal problems involved in the control and use of atomic energy will be examined, including the Atomic Energy Act, the policy underlying the present government program, the security problem of safeguarding atomic military information, the implications of prospective industrial control and use, and legal means of protecting personal interests against the possible consequences of atomic warfare.

416 *Criminal Practice and Administration* (2)

Corper

Spring—as arranged.

Group study of the fundamental aspects of criminal procedure with special reference to practice before the District of Columbia and federal courts; the law of arrest, searches and seizures, self-incrimination, the function of the preliminary examination and grand jury, sufficiency of indictments, trial procedure, and the order of plea and motions.

420 *Estate Planning Seminar* (2)

Spring—evening

Group study of the effective disposition of wealth, inter vivos and testamentary gifts, conservation for owner's future use, use of insurance, tax and administrative problems, business interests, pension and profit-sharing arrangements.

424 *Evidence and Trials Seminar* (2)

Fryer

1958-59 and alternate years

Study of selected problems involving presentation of documentary proof and expert testimony in connection with the reforms made by the Uniform Rules of Evidence and recent developments in the field of forensic medicine.

428 *Food and Drug Law* (2)

Gosditch, Kleinfeld

Spring—evening.

A lecture and discussion course dealing with the Federal Food, Drug, and Cosmetic Act and governmental controls thereunder. Both government and industry viewpoints are considered.

431 *Government Contract(s) I* (2)

McIntire

Fall—evening

A consideration of the basic power of the Federal Government to enter into contracts; the nature and construction of such contracts; normal

and war or defense powers aspects of government procurement, including administrative and legislative policy and procedures, forms of contracts; standard clauses, advertised bid procedure problems, negotiated contracts; modification of contracts, remedies on contractual claims.

- 432 *Government Contracts II* (2) McIntire  
Spring—evening.

Special problems in government contracts, including adjustments and relief, procedure for presenting claims under government contracts, attempts at price, cost, or profit controls; termination.

- 437 *International—Comparative Law Seminar* (2) Murdock  
Fall—evening.

Group study of contemporary problems in international and comparative law.

- 442 *Labor Law Seminar* (2) Merrifield  
Spring—evening.

Group study of contemporary problems in labor law.

- 446 *Law of Money and Monetary Obligations* (2) Dach  
Not offered 1957-58.

Introductory survey of the provisions of public law by which money is administered, relating particularly to the Federal Reserve System; the legal character of money and of monetary obligations; legal functions, the "Federal Reserve Act" and the functions, powers, and duties (policy, monetary, and policy making). Particular emphasis will be given to the law relating to foreign money.

- 449 *Law of the Near East* (2) Liebesny  
1957-58 and alternate years: fall—morning

A study of the law of the Arab countries, including the basic principles of the Islamic law, an analysis of the present day codes and an investigation of the Western influences on the laws of the Arab countries.

- 455 *Legal Problems in Modern Methods of Warfare* (2)

Fall—evening.

The contemporary international law of war, legal aspects of various methods of combat (conventional, poison, biological, and nuclear), regulation of hostilities, the special problems of atomic, bacteriological, and chemical weapons; war crimes.

459 *Military Law and Jurisdiction* (2)

Not offered 1957-58

Sources of military jurisdiction; military law proper, including court martial, summary and summary before, during and after war; military government; martial law, laws of war and treatment of offenders.

463 *Regulation of Communication Media* (2)

Mayo

Spring—evening.

An examination of the legal doctrine relating to regulatory practices in the domains of mass communications, i.e., newspapers, motion pictures, and radio-television; analysis of the structural structure of the mass media and the pattern of control imposed by government, private associations, and various community groups; appraisal of the comparative utility of various regulatory techniques for implementing policies affecting these media. Special emphasis will be placed on the functions of the Federal Communications Commission.

465 *Regulation of Securities and Securities Markets* (2)

Kroll

1958-59 and alternate years

A study of state and federal laws governing the offering and distribution of securities to the public by corporate issuers and others; the regulation of securities markets; and the rights and liabilities of purchasers under such statutes. Particular emphasis will be given to statutes administered by the Securities and Exchange Commission.

469 *Research in Patent, Trade-Mark, and Copyright Law* (2)

Harris

Fall—as arranged; spring—as arranged.

Registration is limited to students who have taken Patent Law I and II and related courses including, as a rule, Trade Regulation Seminars, and who have at least a B average. A request in writing, with a proposed outline of the topic of research, must be submitted to the Dean at least one month prior to registration day. Registration is permitted for one semester only and the work must be completed within the semester.

471 *Research in Public Law* (2)

The Staff

Fall—as arranged, spring—as arranged.

Registration is limited to students who have previously had a seminar or comparable course in the field of the proposed research and who have at least a B average. A request in writing, with a proposed outline of the topic of research, must be submitted to the Dean at least one month prior to registration day. Registration is permitted for one semester only and the work must be completed within the semester.



- 475 *Taxation—Corporate* (2) Driscoll  
Fall—evening.  
Case law and 1954 Internal Revenue Code provisions applicable to corporations; analysis of corporate distributions, redemptions of stock, reorganizations and mergers, collapsible corporations, corporate liquidations, sales of business enterprises; personal holding companies, accumulated earnings tax, and carry-overs.
- 478 *Taxation of Foreign Income Seminar* (2) Driscoll  
Not offered 1957-58.  
Group study of methods of taxing income received from abroad and taxation of non-resident aliens; analysis of principal income taxation and estate taxation treaties; consideration of legislative proposals for taxation of foreign income.
- 480 *Taxation—Oil and Gas* (2) Driscoll  
Spring—evening  
A study of the case law relating to percentage depletion, sales and transfers of interests in oil and gas properties, legal aspects of financing methods in oil and gas operations. Application of partnership and corporation provisions of the 1954 Internal Revenue Code to oil and gas activities.
- 485 *Taxation Seminar* (2) Driscoll  
Spring—evening  
Group study of special problems and recent developments in federal taxation.
- 492 *Trade Regulation Seminar* (2) Weston  
Spring—evening.  
Group study of current problems relating to unfair trade practices and federal anti-trust laws.
- 495 *Urban Redevelopment* (2) Orentlicher  
Fall—evening.  
Selected problems in urban redevelopment and housing, with particular emphasis on programs under current federal and state legislation.



## MATHEMATICS

James Henry Taylor, Ph.D., *Professor of Mathematics*

Francis Edgar Johnston, Ph.D., *Professor of Mathematics*

Florence Marie Mears, Ph.D., *Professor of Mathematics*

Isidor Heller, Ph.D., *Professorial Lecturer in Mathematics*

Nels David Nelson, Ph.D., *Associate Professor of Mathematics, Executive Officer*

Louis William Tordella, Ph.D., *Associate Professorial Lecturer in Mathematics*

Earl Larkin Williams, A.M., *Lecturer in Mathematics*

*Bachelor of Arts or Bachelor of Science with a major in Mathematics (Columbia College—Departmental)*—Prerequisite: the Arts and Letters or the Science curriculum, respectively, in the Junior College, see pages 66 and 67.

**Required:** in addition to the general requirements as stated on pages 82-83, fifteen semester hours of Mathematics of approved second- and third-year courses.

*Master of Arts or Master of Science in the field of Mathematics (Columbia College)*—Prerequisite: a Bachelor of Arts or Bachelor of Science degree, respectively, with a major in Mathematics at this University, or the equivalent.

**Required:** the general requirements as stated on pages 87-91.

*Doctor of Philosophy (Graduate Catalog)*—See page 7.

*Bachelor of Science in Engineering with an option in Mathematics (School of Engineering)*—For requirements see pages 137-39, 142-43.

*Bachelor of Arts in Education with a teaching field in Mathematics (School of Education)*—Prerequisite: the Education curriculum in the Junior College, page 68.

**Required:** the Mathematics option, page 107, and the professional courses listed on pages 169-70.

### FIRST GROUP \*

#### 3 *College Algebra* (3)

The Study

Fall—morning and evening, spring—morning and evening, summer 1957.

Exponents and logarithms, linear equations, complex numbers, quadratic equations, introduction to theory of equations, mathematical induction and the binomial theorem, permutations, combinations, and probability, determinants, progressions. Prerequisite: one year each of high school algebra and high school geometry.

\* No first course course in mathematics is available for college credit if the student's previous training in mathematics meets the prerequisite for a higher numbered course.

- 6 *Plane Trigonometry* (3) The Staff  
 Fall—morning and evening; spring—morning and evening; summer 1957.  
 Prerequisite: two years of high school Algebra and one year of high school geometry, or Mathematics 5 (or concurrent registration thereof).
- 12 *Analytic Geometry* (3) The Staff  
 Fall—morning and evening; spring—morning and evening; summer 1957.  
 Prerequisite: Mathematics 3 and 6, or two years of high school algebra, one year of high school geometry, and one-half year of high school trigonometry.
- 19 *Differential Calculus* (3) The Staff  
 Fall—morning and evening; spring—morning and evening; summer 1957.  
 Prerequisite: Mathematics 12.
- 20 *Integral Calculus*\* (3) The Staff  
 Fall—morning and evening; spring—morning and evening; summer 1957.  
 Prerequisite: Mathematics 19.

## SECOND GROUP\*

- 102 *Fundamental Concepts of Mathematics* (3) Nelson  
 1957-58 and alternate years fall—evening.
- 103 *Calculus and Differential Equations* (3) The Staff  
 Fall—morning and evening; spring—morning and evening; summer 1957.
- 112 *Mathematics for Engineers and Scientists* (3) Johnston  
 Fall—morning.  
 Topics from advanced calculus, partial differential equations, vector analysis, and complex variables. Prerequisite: Mathematics 19 or 131.
- 123 *Theory of Equations* (3) The Staff  
 Fall—morning.
- 125 *Advanced Algebra* (3) Johnston  
 Spring—morning; summer 1957.

\* Mathematics 20 is a prerequisite to all second-group courses.

- 126 *Advanced Analytic Geometry* (3) Taylor  
Spring—evening
- 132 *Differential Equations* (3) The Staff  
Spring—evening
- 134 *Introduction to Boundary Value Problems* (3)  
1958-59 and alternate years  
Prerequisite: Mathematics 103 or 132
- 135-36 *Projective Geometry* (2-2)  
A year course; credit is not given for the first half until the second half is completed.  
Not offered 1957-58.
- 139 *Advanced Calculus* (3) Mears  
Fall—evening
- 143 *Introduction to Analysis* (3) Mears  
Spring—evening  
Prerequisite: Mathematics 134
- 141 *Introduction to Infinite Series* (3)  
1958-59 and alternate years
- 167 *Fourier Series and Spherical Harmonics* (3)  
Not offered 1957-58  
Prerequisite: Mathematics 133 or 132
- 171 *Vector Analysis* (3) Taylor  
Fall—evening

## THIRD GROUP

- 202 *Mathematical Logic* (3) Nelson  
1957-58 and alternate years; spring—evening
- 222 *Theory of Numbers* (3)  
Not offered 1957-58
- 237-38 *Theory of Functions* (3-3) Johnston  
A year course; credit is not given for the first half until the second half is completed.  
1957-58 and alternate years; academic year—evening

- |         |   |           |
|---------|---|-----------|
| 242     | <i>Infinite Series</i> (3)  | Mears     |
|         | 1958-59 and alternate years.  |           |
| 243-44  | <i>Numerical Analysis</i> (3-3)   | The Staff |
|         | 1957-58 and alternate years: academic year—evening.                                       |           |
|         | Prerequisite: Mathematics 123 or 132.   |           |
| 249     | <i>Ordinary Differential Equations</i> (3)  | Taylor    |
|         | Fall—evening.   |           |
| 250     | <i>Integral Equations</i> (3)   |           |
|         | Not offered 1957-58.  |           |
| 251-52  | <i>Theory of Functions of a Real Variable</i> (3-3)                                       |           |
|         | A year course: credit is not given for the first half until the second half is completed. |           |
|         | 1958-59 and alternate years.  |           |
| 255     | <i>Differential Geometry</i> (3)  |           |
|         | Not offered 1957-58.  |           |
| 257     | <i>Theory of Groups</i> (3)   |           |
|         | Not offered 1957-58.  |           |
| 265-66  | <i>Modern Algebra</i> (3-3)   | Johnston  |
|         | First half: fall—evening. Second half—not offered 1957-58.                                |           |
| 268     | <i>Calculus of Variations</i> (3)   | Taylor    |
|         | Spring—evening.   |           |
| 270     | <i>Tensor Analysis</i> (3)  | Taylor    |
|         | Summer 1957.  |           |
| 277     | <i>Partial Differential Equations</i> (3)   |           |
|         | Not offered 1957-58.  |           |
| 278     | <i>Introduction to Topology</i> (3)   |           |
|         | 1958-59 and alternate years.  |           |
| 295-96  | <i>Reading and Research</i> (3-3)   | The Staff |
|         | Academic year—as arranged.  |           |
| 299-300 | <i>Thesis</i> (3-3)   | The Staff |



## MECHANICAL ENGINEERING

Benjamin Carpenter Cruickshanks, B.S. in M.E., *Professor of Mechanical Engineering, Executive Officer*

John Kaye, M.S. in M.E., *Associate Professor of Mechanical Engineering*

Paul Arthur Crafton, B.M.E., Ph.D., *Associate Professor of Mechanical Engineering*

Jack Hayden Lewis, B.S., *Assistant Professor of Mechanical Engineering*

Philip Sidney Morgan, Jr., B.S., M.S. in M.E., *Assistant Professor of Mechanical Engineering*

George Calvin Weaver, M.S., *Assistant Professor of Mechanical Engineering*

Frank Joseph Powell, M.S., *Lecturer in Mechanical Engineering*

Raphael David Cahn, B.M.E., *Lecturer in Mechanical Engineering*

Robert William Pinnes, M.M.E., *Lecturer in Mechanical Engineering*

Leo Shanley Straw, B.S. in C.E., *Associate in Mechanical Engineering*

## ENGINEERING ADMINISTRATION

Jack Edward Walters, M.S. in M.E., Ph.D., *Professor of Engineering Administration: Director, Engineering Administration Program*

Glen Darwin Camp, Ph.D., *Professor of Operations Research*

Robert Irving Sarbacher, Sc.D., E.E., *Professorial Lecturer in Engineering Administration*

Frederick Thorp Moore, Ph.D., *Professorial Lecturer in Engineering Administration*

Gilbert Chester Jacobus, B.S. in C.E., M.B.A., LL.B., *Professorial Lecturer in Engineering Administration*

Kenneth Frederick McClure, M.S., LL.B., *Professorial Lecturer in Engineering Administration*

Kenneth Seymour Colmen, Ph.D., *Professorial Lecturer in Engineering Administration*

Frederick Charles Dyer, M.B.A., *Professorial Lecturer in Engineering Administration*

Thomas Phillip Liverman, Ph.D., *Professorial Lecturer in Engineering Administration*

Frank Miller Reynolds, LL.M., B.S., *Professorial Lecturer in Engineering Administration*

Boone Doudy Tillet, LL.B., M.S., Sc.D., *Associate Professor of Engineering Administration*

*Bachelor of Mechanical Engineering (School of Engineering)*—See pages 137-39 and 143-44 for statement of requirements.

*Master of Science in Engineering (School of Engineering)*—See pages 143-45 for statement of requirements.

*Master of Engineering Administration*—See pages 145-47.

*Mechanical Engineer (School of Engineering)*—See page 147 for statement of requirements.

#### FIRST GROUP

### 3-4 *Graphical Communication I-II* Morgan, Lewis, Straw (2-2)

Autumn year—morning and evening.

Special visualization and spatial perspective, free-hand drawing, views by means of descriptive geometry, pattern and orthographic descriptive geometry. Drawing-room fee \$10 a semester.

### 5 *Orientation and Engineering Problem* (2) Crafton and Staff

Fall—morning and evening, spring—morning and evening.

Orientation problems and Orientation in college. Introduction to slide rule, engineering logic and ethics, engineering method of problem solving, nature of study and work. Simple problems in engineering.

### 6 *Engineering Problems* \* (2) Crafton and Staff

Fall—morning and evening, spring—morning and evening, summer 1957.

Simple engineering problems in statics, dynamics, energy, heat and electricity. Training in systematic engineering analysis and synthesis of mathematics in engineering problems. Prerequisite: Mechanical Engineering 2; removal of all college deficiencies in science and mathematics.

### 14 *Analytical Kinematics* (3) Cain

Spring—morning and evening.

Analytical study of constrained motion of rigid bodies and three-dimensional kinematics, bar linkages, cams, and gears. Prerequisite: Physics 2, Mechanical Engineering 4 and 6. Prerequisite or concurrent instruction: Mathematics 134.

#### SECOND GROUP

### 113 *Theoretical Thermodynamics I* (3) Crutcher-Stankis

Fall—morning and evening.

Fundamental concepts, equations of state, first and second laws of thermodynamics, entropy, simple and polytropic mixtures. Prerequisite: Chemistry 12, Mathematics 23, Physics 8.

\* This course should be completed before the beginning of the sophomore year.

- 114 *Theoretical Thermodynamics II* (3) Cruickshanks  
1957-58 and alternate years: spring—morning and evening; 1958-59 and alternate years: spring—evening.  
Vapor cycles, combustion, gas dynamics, equilibria, multicomponent mixtures. Prerequisite: Mechanical Engineering 111, Mathematics 112. Prerequisite or concurrent enrollment: Civil Engineering 112, Mechanical Engineering 118.
- 118 *Heat Transfer* (3) The Staff  
Spring—morning and evening.  
Heat transfer theory, conduction, convection, radiation, fluid and potential theory applied to conduction. Lecture and laboratory. Laboratory fee, \$16. Prerequisite: Mechanical Engineering 111, Mathematics 112.
- 120 *Physical Metallurgy* (3) The Staff  
1957-58 and alternate years: spring—evening; 1958-59 and alternate years: spring—morning.  
Physics of metals, crystal and lattice structures, theory and sensory changes, properties of alloys, non-equilibrium conditions, phase diagrams. Prerequisite: Mathematics 11, Civil Engineering 125.
- 123 *Advanced Dynamics* (3) Cresslin  
1957-58 and alternate years: fall—morning; 1958-59 and alternate years: fall—evening.  
Dynamics of a particle and systems of particles, dynamics of a motion with constraints, vibration, shock, the gyroscope. Prerequisite: Mathematics 114, Civil Engineering 119, Electrical Engineering 11, Mechanical Engineering 14. Prerequisite or concurrent enrollment: Civil Engineering 187.
- 175-76 *Heat Power Engineering* (3-3) Cruickshanks  
1957-58 and alternate years: academic year—morning; 1958-59 and alternate years: academic year—evening.  
Analysis and design principles powerplant systems and components in heat power, gas and vapor turbines, internal combustion engines, fuel systems, nuclear power systems. Lecture and laboratory. Laboratory fee, \$15 a semester. Prerequisite: Physics 101, Civil Engineering 141, Mechanical Engineering 114, 118. Prerequisite or concurrent enrollment: Mechanical Engineering 116.
- 139 *Fluid Machinery* (3) Mason  
1957-58 and alternate years: fall—morning; 1958-59 and alternate years: fall—evening.  
Positive-displacement machines, hydraulic circuits and servomechanisms, general theory of dynamic machines, velocity diagrams and



work transfer; blade-element and lattice analysis; radial, axial, and mixed flow machines. Lecture and laboratory. Laboratory fee, \$1. Prerequisite: Civil Engineering 132, Mechanical Engineering 114. Prerequisite or concurrent registration: Mechanical Engineering 123.

143 *Production Engineering* (3) Weaver

1957-58 and alternate years: fall—evening; 1958-59 and alternate years: fall—morning.

Principles of production engineering, programming, production methods, quality control, automation, operations analysis. Prerequisite: Mechanical Engineering 14, 120; Mathematics 112.

146 *Dynamics of Compressible Fluids* (3) Kaye

1957-58 and alternate years: spring—morning; 1958-59 and alternate years: spring—evening.

Mathematical theory of compressible fluid flow, flow around immersed bodies, airfoil theory, shock wave theory, thermodynamics of compressible fluids. Laboratory fee, \$10. Prerequisite: Mechanical Engineering 118, 139.

148 *Machine Analysis and Synthesis* (3) Crafton

1957-58 and alternate years: spring—evening; 1958-59 and alternate years: spring—morning.

Analysis and synthesis of machine components and of complete mechanisms, relations of machine and system, applications of automatic control. Prerequisite: Electrical Engineering 12, Mechanical Engineering 143, 145, 146, 147. Prerequisite or concurrent registration: Mechanical Engineering 152.

152 *Instrumentation* (4) Crafton

1957-58 and alternate years: spring—evening; 1958-59 and alternate years: spring—morning.

Theory of measurement and automatic control systems, including electromechanical, pneumatic, and hydraulic systems. Lecture and laboratory. Laboratory fee, \$10. Prerequisite: Physics 131, Electrical Engineering 12, Mechanical Engineering 143, 146, 147. Prerequisite or concurrent registration: Mechanical Engineering 148.

### THIRD GROUP

201 *Automatic Control* (3) The Staff

Fall—evening.

Theory of measurement and control systems including characteristics of equipment, transfer functions, system analysis, dynamic analysis, multivariable systems, and non-linearities.



**211 Thermodynamics and Statistical Mechanics (3) The Staff**

Fall—as arranged; spring—as arranged.

Reversible and irreversible processes, equilibrium, ideal and van der Waal's gases, dilute solutions, phase equilibria, electrical and magnetic effects, radiation. Introduction to kinetic theory and combinatorial statistical mechanics.

**213 Advanced Heat Transfer (3) The Staff**

Fall—as arranged; spring—as arranged.

Physical and mathematical concepts of heat transfer phenomena under steady and unsteady conditions, including Stefan-Boltzmann and Planck laws for radiation, Fourier heat equation for conduction, dimensional analysis, and boundary layer theory for convection.

**215 Gas Dynamics (3) The Staff**

Fall—as arranged; spring—as arranged.

Theory of gas dynamics including combustion, shock phenomena, dynamics of flow, and heat transfer for high temperature gases.

**220 Non-linear Mechanics (3) The Staff**

Spring—evening.

Topological and analytical methods in non-linear mechanics, non-linear resonance, relaxation oscillations.

**233 Supersonic Flow and Shock Waves (3) The Staff**

Fall—as arranged; spring—as arranged.

Thermodynamics of one-dimensional compressible fluid flow in nozzles and jets, two-dimensional waves and shocks, plane flow and airfoils, three-dimensional flow around slender bodies at supersonic and transonic, three-dimensional wing theory, limit waves.

**ENGINEERING ADMINISTRATION**

The School of Engineering offers the following courses primarily for candidates for the degree of Master of Engineering Administration. Other courses listed in this program are offered by the departments of Accounting, Business and Public Administration, Geography, Psychology, Speech, and Statistics, as announced at the end of the courses of instruction for these departments, under the heading, "Courses Offered in Special Programs."

**SECOND GROUP****191 Engineering Law (3) McClure**

Fall—evening.

The influence of contract, property, and tort law upon engineering activities. Covers legal principles relating to the organization and

management of engineering companies and governmental departments, and legal procedure of interest to engineers. Specific topics considered include contracts, agency, partnership, corporations, liens, and expert testimony.

### THIRD GROUP

- 201 *Engineering Administration I* (3) Walters, Tillett, Kaye  
Fall—evening.

The principles and practices of administration of engineering and science activities, including: organization, planning, management, and function (responsibility, policy); and the application and use of scientific method in administration. Case study is emphasized.

- 202 *Engineering Administration II* (3) Walters, Tillett, Kaye  
Fall—evening.

Continuation of *Engineering Administration I*, covering: direction, delegation, coordination, control, budgeting, audit, and evaluation. Relations between technical and administrative personnel are treated with particular reference to appraisal and accountability. Case study is widely employed.

- 205 *Engineer and Society* (3) Walters  
Spring—evening.

Role of the engineer and the engineering profession in society, the influence of humanism in engineering and scientific activities, and the responsibility of engineering to the community, state, nation, and the world. Case studies by the student are required.

- 211 *Communication of Ideas I* (3) Dyer  
Fall—evening.

The purpose of this course is to improve skills and abilities in written communications, including: technical reports, administrative correspondence, articles for publication, and other means of presenting ideas to technical and non-technical audiences. The principles and practices of formal technical communication, the relative effectiveness of graphic, tables, flow-charts, diagrams, and other non-verbal vehicles of communication, and the treatment aspects of technical communication, such as the selection of content, preparation of material for readers of different backgrounds and objectives, and adaptation of communication to the form to the need of the technical presentation.

- 251 *Management of Research and Development* (3) Sarbacher, Colmen  
Fall—evening.

Management problems involved in the administration of research and development programs, including: exploration of techniques and proce-

sis is programming, selection of organizations or contractors for research, maintenance, control and evaluation of projects. Prerequisite: Engineering Administration 201 and 202, or consent of instructor.

- 252 *Production and Maintenance Management* (3) The Staff  
Spring—evening

The managerial implications of the rapid industrial evolution toward automation. Study of skills and abilities essential to industrial management, including maintenance of equipment and tool inventors, the relationship between the technology of several industrial engineering and the policies and programs of maintenance and production. Prerequisite: Engineering Administration 201 and 202, or consent of instructor.

- 261 *Economic Analysis in Engineering Planning* (3) Moore  
Fall—evening

The application of economic principles to engineering administration: costs, outputs, investments, and profits. Studies are made of the methods of analyzing economic factors in evaluating alternate courses of administrative action in government and industry.

- 271 *Operations Research* (3) Camp, Liverman, Kaye  
Fall—evening

Survey of operations research, including: descriptive history, application of a practitioner; review of basic probability theory with emphasis on application and specialized techniques (such as queueing theory, linear programming, information theory, game theory, distribution of queue problems); case studies, and evaluation of operations research reports.

- 272 *Operations Research (Field Work)* (3) Camp, Liverman  
Spring—evening

Guided field work in operations research on industrial and other operations, includes a selection of the operations to be studied and the formulation and solution of problems. Prerequisite: Engineering Administration 271 or consent of instructor.

- 290 *Problems in Engineering Administration* (3) Walters, Tillett, Kaye  
Fall—evening; spring—evening

The application of scientific methods to the solution of a comprehensive problem in engineering administration. An administrative problem, selected by the student and approved by the instructor (preferably involving a variety of the principles, procedures, and disciplines studied in the program of the Master of Engineering Administration), is solved and the solution evaluated. The course is taken within the last two semesters of the Master's program.



## MEDICINE

Thomas McPherson Brown, A.B., M.D., *Eugene Meyer Professor of Medicine, Executive Officer*

Monroe James Romansky, A.B., M.D., *Professor of Medicine*

Charles Robert Lee Halley, A.B., M.D., *Clinical Professor of Medicine*

Clayton Bernard Ethridge, M.D., *Clinical Professor of Medicine*

Louis Katz Alpert, B.S., M.D., *Clinical Professor of Medicine*

Sol Katz, B.S., M.D., *Adjunct Clinical Professor of Medicine*

Joseph Francis Fazekas, B.S., M.D., *Adjunct Clinical Professor of Medicine*

Robert William Berliner, B.S., M.D., *Professorial Lecturer in Medicine*

Henry Field, Jr., B.S., M.D., *Professorial Lecturer in Medicine*

John Coleman Nunemaker, M.S., M.D., *Professorial Lecturer in Medicine*

Thomas Hodge McGavack, A.B., M.D., *Professorial Lecturer in Medicine*

John McCallum Evans, A.B., M.D., *Associate Professor of Medicine*

Peter Diacounis Comanduras, B.S., M.D., M.S. in Med., *Associate Clinical Professor of Medicine*

Clarence Richard Hartman, A.B., M.D., *Associate Clinical Professor of Medicine*

Walter Kendall Myers, B.S., M.D., *Assistant Clinical Professor of Medicine*

John Alton Reed, A.B., M.D., *Assistant Clinical Professor of Medicine*

Theodore Judson Abernethy, B.S., M.D., *Assistant Clinical Professor of Medicine*

William Travis Gibb, A.B., M.D., *Assistant Clinical Professor Medicine*

Roy Hertz, Ph.D., M.D., *Assistant Clinical Professor of Medicine*

Samuel Ross Taggart, M.D., *Assistant Clinical Professor of Medicine*

Benjamin Manchester, M.D., *Assistant Clinical Professor of Medicine*

Pearl Holly, M.S., M.D., *Assistant Clinical Professor of Medicine*

James Joseph Feller, A.B., M.D., *Assistant Clinical Professor of Medicine*

Ludwig George Lederer, M.D., Ph.D., *Assistant Clinical Professor of Medicine*

John Eldrid Smith, A.B., M.D., *Assistant Clinical Professor of Medicine*

John Watkins Tremis, A.B., M.D., *Assistant Clinical Professor of Medicine*

Albert David Kistin, A.M., M.D., *Assistant Clinical Professor of Medicine*



- Andrew Gabriel Prandoni, B.S., M.D., *Assistant Clinical Professor of Medicine*
- Ruth Hechler Wichelhausen, M.D., *Assistant Clinical Professor of Medicine*
- Lawrence Elias Putnam, A.B., M.D., *Assistant Clinical Professor of Medicine*
- Roy Ernest Albert, A.B., M.D., *Assistant Clinical Professor of Medicine*
- Halla Brown, M.D., *Assistant Clinical Professor of Medicine*
- Elizabeth Harman Hill, M.D., *Assistant Clinical Professor of Medicine*
- Maurice Protas, A.B., M.D., *Associate in Medicine*
- John Minor, A.B., M.D., *Associate in Medicine*
- Lawrence Jay Thomas, B.S., M.D., *Associate in Medicine*
- Charles William Ordman, A.B., M.D., *Associate in Medicine*
- Benjamin Calloway Jones, Jr., A.B., M.D., *Associate in Medicine*
- Richard Bernard Castell, A.B., M.D., *Associate in Medicine*
- Myer Harold Stolar, B.S., M.D., *Associate in Medicine*
- Sam Thompson Gibson, B.S., M.D., *Associate in Medicine*
- Walter Lewis Nalls, B.S., M.D., *Associate in Medicine*
- Alfred Brigulio, M.D., *Associate in Medicine*
- Ralph Bretnev Miller, A.B., M.D., *Associate in Medicine*
- Thomas Stone Sappington, A.B., M.D., *Associate in Medicine*
- Ernest Cotlove, B.S., M.D., *Associate in Medicine*
- Thomas James Kennedy, Jr., B.S., M.D., *Associate in Medicine*
- Jack Orloff, M.D., *Associate in Medicine*
- John Christian Ransmeier, A.B., M.D., *Associate in Medicine*
- Samuel Jacob Nathan Sugar, Phar.G., M.D., *Associate in Medicine*
- Joseph Nev, B.S., M.D., *Associate in Medicine*
- Joseph Beinstein, A.B., M.D., *Associate in Medicine*
- Frank Solomon Bacon, B.S., M.D., *Associate in Medicine*
- Henry Dunlop Ecker, B.S., M.D., *Associate in Medicine*
- Jack Jacob Rheingold, A.B., M.D., *Associate in Medicine*
- Irene Gorski Tamagna, M.D., *Associate in Medicine*
- Adrian Michael Hogben, M.D., Ph.D., *Associate in Medicine*
- John Bayne Marbury, M.D., *Associate in Medicine*
- Louis Ross, M.D., *Associate in Medicine*
- Frederic Dunbar Chapman, A.B., M.D., C.M., *Associate in Medicine*
- John Wilmer Latimer, Jr., M.D., *Associate in Medicine*
- Luther Henry Snyder, A.B., M.D., *Associate in Medicine*
- Charles Wilson Jones, A.B., M.D., *Associate in Medicine*
- Thomas Joseph Pekin, B.S., M.D., *Associate in Medicine*
- Robert George Taylor, M.D., *Associate in Medicine*
- Charles Waters Thompson, M.D., *Associate in Medicine*
- James Walling Long, M.D., *Associate in Medicine*

- Eugene Solomen Gladson, B.S., M.D., *Associate in Medicine*  
 Maurice Mensh, M.D., *Associate in Medicine*  
 Arthur Rosenbaum, B.S., M.D., *Associate in Medicine*  
 Jarvis Edwin Seegmiller, A.B., M.D., *Associate in Medicine*  
 Iryin Kerlan, B.S., M.D., C.P.H., *Associate in Medicine*  
 Virginia Patterson Beelar, A.B., M.D., *Associate in Medicine*  
 Lester Sylvan Blumenthal, A.B., M.D., M.S. in Med., *Associate in Medicine*  
 Stanley William Kirstein, B.S., M.D., *Associate in Medicine*  
 James Francis Ambury, B.S., M.D., *Associate in Medicine*  
 Robert Norwood Coale, B.S., M.D., *Associate in Medicine*  
 Israel Kessler, M.S., M.D., *Associate in Medicine*  
 Francis James Murray, B.S., M.D., *Associate in Medicine*  
 Edwin Pearson Parker III, B.S., M.D., *Associate in Medicine*  
 Morris Hirsh Rosenberg, A.B., M.D., *Associate in Medicine*  
 John William DuChes, M.D., *Associate in Medicine*  
 Warren Daniel Brill, B.S., M.D., *Associate in Medicine*  
 Marvin Fuchs, B.S., M.D., *Associate in Medicine*  
 William Jack Weaver, Jr., A.B., M.D., *Associate in Medicine*  
 Ruth Boshwitz Benedict, A.B., M.D., *Associate in Medicine*  
 Harold Martin Silver, A.B., M.D., *Associate in Medicine*  
 Stewart William Bush, B.S., M.D., *Associate in Medicine*  
 James Theodore Burns, M.D., *Associate in Medicine*  
 William Otis Bailey, Jr., M.D., *Associate in Medicine*  
 Thomas Lees Hartman, A.M., M.D., *Associate in Medicine*  
 Boris Rabkin, A.B., M.D., *Associate in Medicine*  
 Morton Harold Rose, M.D., *Associate in Medicine*  
 Cyril Augustus Schulman, B.S., M.D., *Associate in Medicine*  
 Louis Aleck Craig, Jr., A.B., M.D., *Associate in Medicine*  
 Abraham Wolfe Danish, A.B., M.D., *Associate in Medicine*  
 Milton Gusack, A.B., M.D., *Associate in Medicine*  
 Adolph Friedman, A.B., M.D., *Associate in Medicine*  
 Alvin Edward Parrish, M.D., *Associate in Medicine*  
 James Irving Boyd, M.D., M.S., *Lecturer in Medicine*  
 William Robert Folts, Jr., B.S., M.D., *Instructor in Medicine*  
 George Archibald Kolser, Jr., B.S., M.D., *Instructor in Medicine*  
 Charles Edward Law, M.D., *Clinical Instructor in Medicine*  
 Emil Herbert Bauersfeld, A.B., M.D., *Clinical Instructor in Medicine*  
 Harry Clark Bates, B.S., M.D., *Clinical Instructor in Medicine*  
 Jeanne Cecile Byteman, A.B., M.D., *Clinical Instructor in Medicine*  
 George Sharpe, A.B., M.D., *Clinical Instructor in Medicine*  
 William Lewis, M.D., *Clinical Instructor in Medicine*  
 Alvin Selzer, B.S., M.D., *Clinical Instructor in Medicine*  
 Samuel Dennis Loube, A.B., M.D., *Clinical Instructor in Medicine*

- Nahum Raphael Shulman, M.D., *Clinical Instructor in Medicine*  
 Alfred Baer, A.B., M.D., *Clinical Instructor in Medicine*  
 Jack Kleh, A.B., M.D., *Clinical Instructor in Medicine*  
 Edward Luke Rea, A.B., M.D., *Clinical Instructor in Medicine*  
 James Packard Mann, M.D., *Clinical Instructor in Medicine*  
 Maurice Arthur Sisten, A.B., M.D., *Clinical Instructor in Medicine*  
 William Holmes Crosby, Jr., A.B., M.D., *Clinical Instructor in Medicine*  
 Joseph Hicks Watson, B.S., M.D., *Clinical Instructor in Medicine*  
 Conrad Gossels, M.D., *Clinical Instructor in Medicine*  
 Charles Joseph Savarese, Jr., A.B., M.D., *Clinical Instructor in Medicine*  
 James Eliot Chapman, M.D., *Clinical Instructor in Medicine*  
 Bernard Robert Cosserman, A.B., M.D., *Clinical Instructor in Medicine*  
 Marshall Hannis Jacobson, A.B., M.D., *Clinical Instructor in Medicine*  
 Gottfried Karl Duschik, M.D., *Clinical Instructor in Medicine*  
 Norman Hartley Rosenstein, M.D., *Clinical Instructor in Medicine*  
 Leonard Laster, A.B., M.D., *Clinical Instructor in Medicine*  
 Howard Otis Mott, A.B., M.D., *Clinical Instructor in Medicine*  
 Max Gamble Slater, M.S., M.D., *Clinical Instructor in Medicine*  
 Jesse Leonard Steinthal, B.S., M.D., *Clinical Instructor in Medicine*  
 Donald Morgan Watkins, A.B., M.D., *Clinical Instructor in Medicine*  
 Edward Adelson, B.S., M.D., *Clinical Instructor in Medicine*  
 Stanton Segal, M.D., *Clinical Instructor in Medicine*  
 Gerald John Fisher, A.B., M.D., *Clinical Instructor in Medicine*  
 William Leete Stone, A.B., M.D., *Clinical Instructor in Medicine*  
 Ted Clemens, Jr., B.S., M.D., *Clinical Instructor in Medicine*  
 James Bernard Field, M.D., *Clinical Instructor in Medicine*  
 Agamemnon Despopoulos, M.D., *Clinical Instructor in Medicine*  
 Robert Proulx Heaney, B.S., M.D., *Clinical Instructor in Medicine*  
 Jacob Robbins, A.B., M.D., *Clinical Instructor in Medicine*  
 Bernard Howard Ostrow, A.B., M.D., *Clinical Instructor in Medicine*  
 James Charles Mandes, A.B., M.D., *Clinical Instructor in Medicine*  
 Irene I-Lien Hsu Siu, B.S., M.D., *Clinical Instructor in Medicine*  
 Thomas Leonard Gorsuch, A.B., M.D., *Clinical Instructor in Medicine*  
 Charles David Cooper, A.B., M.D., *Clinical Instructor in Medicine*  
 Bertle Nelson, A.B., M.D., *Clinical Instructor in Medicine*  
 Robert Reid Belton, A.B., M.D., *Clinical Instructor in Medicine*  
 Dorothea Beckh Chapman, M.D., *Clinical Instructor in Medicine*  
 Robert Lynwood Howard, A.B., M.D., *Clinical Instructor in Medicine*  
 Walter Kurland, B.S., M.D., *Clinical Instructor in Medicine*  
 Edward Joseph Leonard, M.D., *Clinical Instructor in Medicine*  
 Paul Wesley Yost, B.S., M.D., *Clinical Instructor in Medicine*



William Kirkman Billingsley, Jr., A.B., M.D., *Clinical Instructor in Medicine*

Robert Sirkosky Gordon, Jr., A.B., M.D., *Clinical Instructor in Medicine*

Donald Sharp Frederickson, B.S., M.D., *Clinical Instructor in Medicine*

Sam Chapman Pascoe, A.B., M.D., *Clinical Instructor in Medicine*

Wilfred Russell Ehrmantraut, B.S., M.D., *Clinical Instructor in Medicine*

Thomas Francis Frawley, A.B., M.D., *Clinical Instructor in Medicine*

100 *Living Anatomy*

The Staff

Spring—1 hour a week.

An introduction to physical diagnosis, with special emphasis on topographical anatomy.

236 *Clinical Microscopy*

The Staff

Spring—1 hour a week.

Conference and studies in the clinical application of laboratory examination of blood, body fluids, excreta, excreta.

242 *Physical Diagnosis*

The Staff

Spring—6 hours a week.

Covers not only theoretical but practical application of principles of physical diagnosis as related to examination of patients.

243-44 *Introduction to Medicine*

The Staff

Academic year—2 hours a week.

Lectures covering the principles of internal medicine preparatory to clinical studies and training in the inpatient and outpatient services.

325-26 *Clinical Clerkship*

The Staff

Eight weeks as arranged during academic year.

Training with bed patients under individual instruction designed to develop ability in examination of patients and case taking as well as practice in clinical microscopy. D. C. General Hospital.

327-28 *Clinical Pathological Conferences I*

The Staff

Academic year—1 hour a week.

Conferences are held at the School of Medicine. Case histories are presented and discussed by the students and members of the Staff. Clinical, laboratory, and necropsy findings are compared.



339-40 *Therapeutic Conferences I* Staff of Medicine and Pharmacology

Academic year—1 hour a week

Conferences designed to emphasize the application of pharmacological principles to the problems of clinical medicine. University Hospital.

349-50 *Medical Conferences* The Staff

Academic year—2 hours a week.

D. C. General Hospital.

421-22 *Outpatient Clinics* The Staff

Six weeks as arranged during academic year.

Individual case studies under personal supervision of the Staff. Daily clinics on current medical problems and seminars stressing physiological aspects of diseases. Individual examinations and instruction in medical specialties. University Hospital.

423-24 *Clinical Clerkship* The Staff

Six weeks as arranged during academic year.

University, Mt. Alto, and D. C. General hospitals.

427-28 *Clinical Pathological Conferences II* The Staff

Academic year—1 hour a week.

Continuation of Medicine 327-28.

429-30 *Clinical Pathological Conferences III* Peery, Halley

Academic year—1 hour a week.

Conferences are held at the University Hospital. Attendance is required of students during their medical clerkships there.

## NEUROLOGY AND NEUROLOGICAL SURGERY

James Winston Watts, B.S., M.D., *Professor of Neurological Surgery,  
Executive Officer*

Harold Stevens, Ph.D., M.D., *Professor of Neurology*

Seymour Solomon Kety, A.B., M.D., *Professional Lecturer in Neurology*

Hyman David Shapiro, M.D., *Associate Clinical Professor of Neurology*

Robert Henry Groh, B.S., M.D., *Associate Clinical Professor of Neurology*

Jonathan Marshall Williams, M.D., *Assistant Clinical Professor of Neurological Surgery*

James Peter Murphy, B.S., M.D., *Assistant Clinical Professor of Neurological Surgery*

Hugo Victor Rizzoli, A.B., M.D., *Assistant Clinical Professor of Neurological Surgery*

Anatole Stephen Dekaban, M.D., Ph.D., *Assistant Clinical Professor of Neurology*

Paul Chodoff, A.B., M.D., *Assistant Clinical Professor of Neurology*

George Davis Weickhardt, M.D., *Associate in Neurology*

Harvey Ammerman, B.S., M.D., *Associate in Neurological Surgery*

George Joseph Hayes, B.S., M.D., *Associate in Neurological Surgery*

James Francis Hammill, B.S., M.D., *Clinical Instructor in Neurology*

Garrett Swain, M.D., *Clinical Instructor in Neurological Surgery*

Marvin Curtis Korengold, D.D.S., B.S., M.D., *Clinical Instructor in Neurology*

John Thomas Lord, A.B., M.D., C.M., *Clinical Instructor in Neurological Surgery*

Delora Fowler Mott, M.D., *Clinical Instructor in Neurology*

Cosimo Ajmone Marsan, M.D., *Clinical Instructor in Neurology*

Norman Harold Horwitz, A.B., M.D., *Clinical Instructor in Neurological Surgery*

Zack Witten Sanders, A.B., M.D., *Clinical Instructor in Neurology*

### 249 *Neurology: Basic*

Stevens, Williams

Fall—1 hour a week

Methods used to study the form and function of the nervous system. Lectures and laboratory demonstrations.

250 *Neurology*

Stevens, Shapiro

Spring—1 hour a week.

Introductory lectures on clinical neurology with specimens, lantern slides, and motion pictures.

331 *Neurology and Neurological Surgery*

Watts, Stevens

Fall—1 hour a week.

Clinical lectures and demonstrations.

333-34 *Neurology and Neurological Surgery, Clinical Clerkship*Stevens, Williams,  
Ammerman

In conjunction with Neurology 335-36. Two weeks in rotation as arranged during academic year.

Instruction in history, physical examination, ordinary clinical procedures. Attendance at neurosurgical operations. Six students in rotation. D. C. General Hospital.

335-36 *Neurological Conferences*

Stevens and Staff

In conjunction with Neurology 333-34. Two weeks in rotation as arranged during academic year.

Clinical conferences one afternoon a week followed by presentation of cases and questions from current necropsies. Six students in rotation. D. C. General Hospital.

431-32 *Neurology and Neurological Surgery Clinic*

Shapiro, Rizzoli

Two hours a week. Six weeks in rotation as arranged during academic year.

Neurological examination clinic. Consultation of staff on ambulatory clinic, demonstration of diagnosis, pathologic diagnosis of neuro-psychiatric cases, ward rounds. Six students in rotation. University Hospital.

433-34 *Clinical Neurology*

Groh

Two hours a week for three weeks in rotation as arranged during academic year.

Neurological examination examinations and demonstrations. Six students in rotation. St. Elizabeth Hospital.

435 *Neurological Surgery (elective)*

Murphy and Staff

Spring—1 hour a week.

Lectures and motion picture demonstration of neurosurgical problems.



## OBSTETRICS AND GYNECOLOGY

- John Parks, M.S., M.D., *Professor of Obstetrics and Gynecology*  
*Executive Officer*
- Henry Lauran Darner, A.B., M.D., *Clinical Professor of Obstetrics and Gynecology*
- George Nordlinger, A.B., M.D., *Clinical Professor of Obstetrics and Gynecology*
- Robert Henry Barter, B.S., M.D., *Associate Professor of Obstetrics and Gynecology*
- Samuel Mayer Dodek, A.M., M.D., *Associate Clinical Professor of Obstetrics and Gynecology*
- Jeremiah Keith Cromer, M.D., *Assistant Clinical Professor of Obstetrics and Gynecology*
- James Albert Dusbabek, M.D., *Assistant Clinical Professor of Obstetrics and Gynecology*
- Clarence Kendall Fraser, Ph.B., M.D., *Assistant Clinical Professor of Obstetrics and Gynecology*
- Barton Winters Richwine, M.D., *Associate in Obstetrics and Gynecology*
- Floyd Sterling Rogers, M.D., *Associate in Obstetrics and Gynecology*
- Rufus Martin Roll, A.B., M.D., *Associate in Obstetrics and Gynecology*
- Caroline Jackson, A.M., M.D., *Associate in Obstetrics and Gynecology*
- William Thurston Lady, M.D., *Associate in Obstetrics and Gynecology*
- Jed Williams Pearson, Jr., A.B., M.D., *Associate in Obstetrics and Gynecology*
- Thomas Miles Leonard, Ph.B., M.D., *Associate in Obstetrics and Gynecology*
- James Glover Sites, M.D., *Instructor in Obstetrics and Gynecology*
- Julius Robert Epstein, M.D., *Clinical Instructor in Obstetrics and Gynecology*
- Morton Selwyn Kaufman, A.B., M.D., *Clinical Instructor in Obstetrics and Gynecology*
- Samuel Hazen Shea, M.D., *Clinical Instructor in Obstetrics and Gynecology*
- Albert Seymour Bright, A.B., M.D., *Clinical Instructor in Obstetrics and Gynecology*
- Shirley Sue Martin, M.D., *Clinical Instructor in Obstetrics and Gynecology*
- Neel Jack Price, B.S., M.D., *Clinical Instructor in Obstetrics and Gynecology*



Roland Essig Bieren, M.D., *Clinical Instructor in Obstetrics and Gynecology*

Alexander LeSueur Russell, M.D., *Clinical Instructor in Obstetrics and Gynecology*

Thomas Ashton Wilson, A.B., M.D., *Clinical Instructor in Obstetrics and Gynecology*

Marvin Peace Footer, A.B., M.D., *Clinical Instructor in Obstetrics and Gynecology*

Donald Walters, B.S., M.D., *Clinical Instructor in Obstetrics and Gynecology*

Joseph Marshall Friedman, A.B., M.D., *Clinical Instructor in Obstetrics and Gynecology*

Leon McNeely Liverett, B.S., M.D., *Clinical Instructor in Obstetrics and Gynecology*

William Prentiss McKelway, A.B., M.D., *Clinical Instructor in Obstetrics and Gynecology*

William Hurlbert Cooper, A.B., M.D., *Clinical Instructor in Obstetrics and Gynecology*

Peter Soyster, M.D., *Clinical Instructor in Obstetrics and Gynecology*

#### 254 *Introduction to Obstetrics and Gynecology*

Dodek, Fraser

Spring—1 hour a week.

Lectures and demonstrations on the development and physiology of the female reproductive system and the management of normal pregnancy.

#### 361-2 *Manikin Demonstrations*

Footer

One hour a week for eight weeks in rotation as arranged during academic year.

The mechanism of labor and various types of operative delivery demonstrated to sections of the junior class. D. C. General Hospital.

#### 417-18 *Obstetrics and Gynecology*

The Staff

Academic year—2 hours a week.

Lectures and demonstrations on the principles of obstetrics and gynecology.

#### 451-52 *Clinical Clerkship*

The Staff

Four weeks during academic year as arranged.

Clerkship with patients, including ward rounds, operating room demonstrations, and weekly conferences. D. C. General Hospital.

439-40 *Clinic in Obstetrics and Gynecology* Parks, Barter, Sites

One hour a week for eight weeks in rotation as arranged during academic year.

Student presentation and discussion of patient problems. Demonstration of treatment used in obstetric and gynecologic practice.

441-42 *Clinical Obstetrics*

The Staff

Academic years as arranged.

Students participate in prenatal and postnatal clinic work, observe the course of labor and deliver patients under supervision, observe and participate in the gynecological clinic and operating rooms at the University and D. C. General hospitals, attend University departmental conferences and many other rounds in the University and D. C. General hospitals.

443-44 *Clinical Gynecology*

The Staff

Eight weeks in rotation as arranged during academic year.

Students observe and participate in the gynecological clinics and operating rooms at the University and D. C. General hospitals.

## OPHTHALMOLOGY

- Ronald Atmore Cox, A.B., M.D., *Professor of Ophthalmology, Executive Officer*  
 Ernest Alfred Watson Sheppard, M.D., C.M., *Clinical Professor of Ophthalmology*  
 Richard Wallace Wilkinson, A.B., M.D., M.S. in Med., *Assistant Clinical Professor of Ophthalmology*  
 Carmon Robert Naples, B.S., M.D., *Associate in Ophthalmology*  
 Walter Joseph Romejko, M.D., *Associate in Ophthalmology*  
 William Paxson Chalfant, Jr., M.D., *Associate in Ophthalmology*  
 William Joseph Graham Davis, A.B., M.D., *Associate in Ophthalmology*  
 Robert Edward duPrey, B.S., M.D., *Associate in Ophthalmology*  
 Robert Day, A.B., M.D., *Associate in Ophthalmology*  
 Melvin Gustavus Niles, A.B., M.D., *Clinical Instructor in Ophthalmology*  
 Oscar Levine, M.D., *Clinical Instructor in Ophthalmology*

### 352 Ophthalmology

The Staff

Spring—one hour a week for sixteen weeks at alternate

lectures covering various aspects of all the principles of ophthalmology.

### 447 Clinic

The Staff

Fall—once arranged.

During regular outpatient service, each student is given supervised instruction in the ophthalmological examination of patients in the University Hospital.

## OTOLARYNGOLOGY

James Jerry McFarland, Jr., B.S., M.D., *Associate Clinical Professor of Otolaryngology, Executive Officer*

Catharine Birch, A.B., M.D., *Associate in Otolaryngology*

Jack Louis Levine, M.D., *Associate in Otolaryngology*

Morris Edward Kinnoff, B.S., M.D., *Associate in Otolaryngology*

Willard Beecher Walters, B.S., M.D., *Associate in Otolaryngology*

Russel Smith Page, Jr., A.B., M.D., *Clinical Instructor in Otolaryngology*

Harry Ward McCurdy, A.B., M.D., *Clinical Instructor in Otolaryngology*

Joseph Aziz Sabri, A.B., M.D., *Clinical Instructor in Otolaryngology*

William Ma Lohon Tribble, A.B., M.D., *Clinical Instructor in Otolaryngology*

### 351 *Otolaryngology*

The Staff

Fall—1 hour a week for fourteen weeks.

Lectures and demonstrations on anatomy, physiology, and diseases of the ear, nose, and throat.

### 354 *Bronchoscopy*

The Staff

Spring—1 hour a week for two weeks.

A series of lectures on the fundamental principles and the use of instruments, including both the bronchoscope and esophagoscope.

### 355-56 *Clinic*

The Staff

One and one-half hours a week in rotation as arranged during academic year.

Practical clinical instruction in the diagnosis and treatment of diseases of the ear, nose, and throat. D. C. General Hospital.



## PATHOLOGY

Thomas Martin Peery, A.B., M.D., *Professor of Pathology, Executive Officer*

Daniel Leigh Weiss, A.B., M.D., *Adjunct Clinical Professor of Pathology*

Frank Nelson Miller, B.S., M.D., *Associate Professor of Pathology*

William Newman, A.B., M.D., *Associate Professor of Pathology*

William Laverne Marsh, B.S., M.D., *Assistant Professor of Pathology*

Lois Irene Platt, A.B., M.D., *Clinical Instructor in Pathology*

### SPECIAL STAFF FOR DEMONSTRATIONS

John Stewart Howe, A.B., M.D., *Assistant Clinical Professor of Pathology*

Erving Francis Geever, M.D., Ph.D., *Assistant Clinical Professor of Pathology*

Lorenz Eugene Zimmerman, A.B., M.D., *Associate in Pathology*

Raymond Georges Gottschalk, B.S., M.D., *Associate in Pathology*

Franklin Martin, Jr., A.B., M.D., C.M., M.S. in Neurol., *Associate in Pathology*

Richard Emery Palmer, A.B., M.D., *Associate in Pathology*

William Francis Enos, A.B., M.D., *Clinical Instructor in Pathology*

Lester Walter Fix, M.D., *Clinical Instructor in Pathology*

Charles Barrie Cook, B.S., M.D., *Clinical Instructor in Pathology*

Frederick William Shullinger, B.S., M.D., *Clinical Instructor in Pathology*

### SPECIAL LECTURERS

Elson Bowman Helwig, B.S., M.D., *Chief, Pathology Division, Armed Forces Institute of Pathology*

Lent Clifton Johnson, B.S., M.D., *Pathologist, Armed Forces Institute of Pathology*

259-60 Pathology

Peery, Miller

Fall—9 hours a week; spring—4 hours a week.

General pathology of inflammations, degenerations, malformations and neoplasms. Special pathology of the lungs and specific diseases. The laboratory work consists of the gross and microscopic study of diseased tissue. Special emphasis is placed on the interrelationships of the various pathological changes and their correlation with symptoms and physical signs.

- 261-62 *Neurology* The Staff  
Academic year—as arranged  
Students are required to attend and assist in the performance of necropsies at the University Hospital.
- 263-64 *Demonstrations in Pathology* Special Staff  
Academic year—1 hour a week  
Great specimens of representative cases from various hospitals are demonstrated and discussed.
- 267-68 *Seminars in Pathology* Special Lecturers  
Academic year—as arranged  
Advanced lectures are presented as arranged on special topics in pathology.
- 320 *Forensic Medicine* Miller  
Spring—1 hour a week  
Forensic pathology and toxicology. The legal and ethical rights and responsibilities of physicians. Legal problems in medicine.
- 323-24 *Surgical Pathology I* Weiss  
Academic year—1 hour a week  
Weekly conferences are held with the student group, followed by the surgical clerkship reviewing current output specimens.
- 327-28 *Clinical Pathological Conferences I* The Staff  
Academic year—1 hour a week  
Conferences are held at the School of Medicine. Case histories are presented and discussed by the students and members of the Staff. Clinical, laboratory, and necropsy findings are compared.
- 427-28 *Clinical Pathological Conferences II* The Staff  
Academic year—1 hour a week  
Continuation of Pathology 327-28.
- 429-30 *Clinical Pathological Conferences III* The Staff  
Academic year—1 hour a week  
Conferences are held at the University Hospital. Attendance is required of students during the medical clerkship there.

492 *Surgical Pathology II*

Newman

Spring—1 hour a week.

A systematic study of the gross and microscopic changes in the organs and tissues commonly removed surgically.

493-94 *Pathology Clerkship (elective)*

The Staff

Academic year—as arranged.

A limited number of students receive training in surgical pathology and necropsies in the laboratories of the University Hospital.

## PEDIATRICS

- Preston Alexander McLendon, B.S., M.D., *Professor of Pediatrics, Executive Officer*
- Margaret Mary Nicholson, A.B., M.D., *Clinical Professor of Pediatrics*
- Edward Lewis, M.D., *Clinical Professor of Pediatrics*
- William Staton Anderson, A.B., M.D., *Clinical Professor of Pediatrics*
- Robert Harold Parrott, M.D., *Clinical Professor of Pediatrics*
- Leroy Edward Hoeck, M.D., *Adjunct Clinical Professor of Pediatrics*
- Joseph Michael LoPresti, B.S., M.D., *Associate Professor of Pediatrics*
- John Augustine Washington, B.S., M.D., *Associate Clinical Professor of Pediatrics*
- Reginald Spencer Lourie, B.S., M.D., Med. Sc.D., *Associate Clinical Professor of Pediatric Psychiatry*
- Mabel Harlakenden Grosvenor, A.B., M.D., *Assistant Clinical Professor of Pediatrics*
- Aaron Nimetz, A.B., M.D., *Assistant Clinical Professor of Pediatrics*
- George Maksim, M.D., M.S. in Ped., *Assistant Clinical Professor of Pediatrics*
- William Allen Howard, A.B., M.D., *Assistant Clinical Professor of Pediatrics*
- John Howell Perlock, B.S., M.D., *Associate in Pediatrics*
- Maynard Irving Cohen, A.B., M.D., *Associate in Pediatrics*
- Mary Katherine Laurence Sartwell, A.B., M.D., *Associate in Pediatrics*
- Allan Bertram Coleman, M.D., *Associate in Pediatrics*
- Charles Frederick Stiegler, A.B., M.D., *Associate in Pediatrics*
- Hugh Gambel Clark, A.B., M.D., *Associate in Pediatrics*
- Adrian Ramos, Jr., B.S., M.D., *Associate in Pediatrics*
- Robert Edward Martin, M.D., *Associate in Pediatrics*
- Charles Richard Webb, B.S., M.D., *Associate in Pediatrics*
- William Stark, A.B., M.D., *Associate in Pediatric Psychiatry*
- Margaret Frances Gutelius, A.B., M.D., *Associate in Pediatrics*
- Archibald Rich MacPherson, A.B., M.D., *Associate in Pediatrics*
- Herbert Harold Diamond, M.D., *Clinical Instructor in Pediatrics*
- Reginald Henry Mitchell, M.D., *Clinical Instructor in Pediatrics*
- Robert Orr Warthen, M.D., *Clinical Instructor in Pediatrics*
- Emmie Annabelle Black, B.S., M.D., *Clinical Instructor in Pediatrics*
- Robert Harper Anderson, M.D., *Clinical Instructor in Pediatrics*
- Warren Godfrey Preisser, A.B., M.D., *Clinical Instructor in Pediatrics*
- Sanford Leon Leikin, M.D., *Clinical Instructor in Pediatrics*
- Bennett Olshaker, A.B., M.D., *Clinical Instructor in Pediatric Psychiatry*



Harold Taylor Yates, M.D., *Clinical Instructor in Pediatrics*  
 Roger Bergstrom, M.D., *Clinical Instructor in Pediatrics*  
 George Joel Cohen, M.D., *Clinical Instructor in Pediatrics*  
 Milton Sanford Glatt, A.B., M.D., *Clinical Instructor in Pediatrics*  
 Marvin Irwin Mones, B.S., M.D., *Clinical Instructor in Pediatrics*

SPECIAL LECTURER

Myron Ezra Wegman, A.B., M.D., M.P.H., *Director, Division of Education and Training, Pan American Sanitary Bureau, Regional Office for the Americas of World Health Organization; Pediatrics*

256 *Pediatrics*

McLendon and Staff

Spring—2 hours a week

Lectures on physiology of the newborn, normal behavior, emotional and physical development, infant nutrition, diseases of the newborn, common anomalies and system diseases of infancy and childhood. Medical School.

357-58 *Clinical Clerkship—General Pediatrics*

LoPresti and Staff

Two weeks as arranged during academic year.

Introduction to clinical pediatrics. Emphasis on bedside discussion and group seminars including the newborn. Ward rounds. Five students in rotation. D. C. General Hospital.

359-60 *Clinical Clerkship—Contagious Diseases*

LoPresti and Staff

Two weeks as arranged during academic year.

Conferences and bedside discussion on contagious and infectious diseases. Prevention and quarantine measures. Five students in rotation. D. C. General Hospital.

361-62 *Clinical Conferences I*

McLendon and Staff

Academic year—1 hour a week.

Required. Presentation and discussion by students of current patient problems. D. C. General Hospital.

363-64 *Ward Rounds*

Nicholson, LoPresti, and Staff

Academic year—as arranged.

Bi-weekly ward rounds, with students and Resident Staff. D. C. General Hospital.

- 365-66 *Psychiatry* Lourie and Staff  
 Academic year—as arranged.  
 Lectures on normal behavior and emotional development. Clinical case analysis.
- 457-58 *Clinical Clerkship* Anderson and Staff  
 Six weeks as arranged during academic year.  
 Full time, including assignment to night and holiday admissions. Case studies on wards under direct Resident supervision. Ward rounds with Staff and Residents. Twelve students. Children's Hospital.
- 459-60 *Outpatient Clinics* Gatelius and Staff  
 Academic year—as arranged.  
 Work in Medical and Specialty clinics including surgery, allergy, Neurology, Child Welfare, Pathology, dermatology, neurology, and child welfare. Children's Hospital.
- 461-62 *Clinical Pathological Conferences* The Staff  
 Academic year—1 hour a week.  
 Clinical and pathological discussion of recent patient history and laboratory data. Children's Hospital.
- 463-64 *Section Conferences* The Staff  
 Academic year—twice a week.  
 Discussion of clinical problems of diagnosis and treatment of current patients. Children's Hospital.
- 465-66 *Section Conferences* The Staff  
 Academic year—hour a week.  
 Surgical, medical, pre- and post-operative management. Children's Hospital.
- 467-68 *Clinical Conferences II* McLendon and Staff  
 Academic year—1 hour a week.  
 Resident Case presentation by residents. Staff and student discussion. Laboratory and microscopy. Medical School.
- 469-70 *Child Guidance and Development* Lourie  
 Academic year—as arranged.  
 Clerkship in fourth year including Well Baby Clinic. Group and case conferences.

## PHARMACOLOGY

Paul Kenneth Smith, Ph.D., *Professor of Pharmacology, Executive Officer*

Ralph Grafton Smith, M.D., Ph.D., *Clinical Professor of Pharmacology*

Bernard Beryl Brodie, Ph.D., *Professorial Lecturer in Pharmacology*

Harold George Mandel, Ph.D., *Associate Professor of Pharmacology*

Clarke Davison, Ph.D., *Assistant Professor of Pharmacology*

Elise Ann Brandenburger Brown, Ph.D., *Assistant Research Professor of Pharmacology*

Moreshwar Vithal Naikarni, Ph.D., *Assistant Research Professor of Pharmacology*

Eberhard Georg Trauss, Ph.D., *Assistant Research Professor of Pharmacology*

### SPECIAL LECTURER IN PHARMACOLOGY

William Vincent Crahan Leidy, Ph.D., *Assistant Chief, Radiobiology Service, Veterans Administration Hospital, Washington, D. C.*

*Master of Arts or Master of Science in the field of Pharmacology (Columbia College).—Prerequisite: a Bachelor of Arts or Bachelor of Science degree. The undergraduate program must include the following courses in the equivalent: Biology or Zoology 1-2; Physics 6, 7 & 8; Chemistry 11-14, 22, 331-35; Biochemistry 241-25 and Physiology 115, 317 are recommended as the minimum number of the number within to complete the work for the Master's degree in one year.*

*Required: the general requirements as stated in 1945-46. The thirty hours of required work must include Biochemistry 221-223; Physiology 115, 317; Pharmacology 201, 205, 207-28, 209-21, 212-13. The remaining courses may be selected from: Biochemistry 224, 225, 22, 231; Physiology 150; Toxicology 111, 202, 203; Pharmacology 28.*

*Master of Arts or Master of Science in the field of Chemotherapy (Columbia College).—Prerequisite: a Bachelor of Arts or a Bachelor of Science degree. The undergraduate program must include the following courses in the equivalent: Biology or Zoology 1-2; Physics 6, 7; Chemistry 11-12, 22, 331-35; Biochemistry 241-22 is recommended as an undergraduate elective if the candidate wishes to complete the work for the Master's degree in one year.*

*Required: Biochemistry 112; Biochemistry 241-22; Pharmacology 201, 207-08, 209-21, 212-13. The remaining courses may be selected from: Biochemistry 202, 203, 21; Biochemistry 224, 225, 226, 231; Physiology 111, 317; Pharmacology 201, 202.*

*Doctor of Philosophy (Graduate Council).—See page 56.*

251 *Pharmacology (5)*

The Staff

Fall-5 hours a week

Lectures and conferences concerning the interaction of drugs and biological systems as a basis for the rational therapy of disease. Open to enrolled medical students.



- |         |  |                                    |
|---------|--|------------------------------------|
| 262     | <i>Chemotherapy (1)</i>  | The Staff                          |
|         | <p>Science—1 hour a week</p> <p>Continuation of Pharmacology 261</p>   |                                    |
| 263     | <i>Pharmacology Laboratory (1½)</i>  | The Staff                          |
|         | <p>Lab—3 hours a week</p> <p>Laboratory instruction and demonstration designed to complement Pharmacology 261. Open to qualified nonmedical students.</p>  |                                    |
| 267-68  | <i>Pharmacological Research (var.)</i>   | The Staff                          |
|         | <p>Academic year—as arranged</p> <p>Primarily for those properly qualified graduate and medical students seeking careers in pharmacology.</p>  |                                    |
| 269-70  | <i>Pharmacology Seminar (1-1)</i>  | The Staff                          |
|         | <p>Academic year—2 hours a week</p> <p>Recent advances in pharmacology. For those interested in pharmacological research. Open to qualified nonmedical students.</p>   |                                    |
| 279-80  | <i>Special Methods in Research (var.)</i>  | The Staff                          |
|         | <p>Academic year—as arranged</p> <p>A course to familiarize the student with advanced biochemical, physiological, and pharmacological methods employed in pharmacological investigations. Open to qualified nonmedical students.</p> |                                    |
| 299-300 | <i>Thesis (3-3)</i>  | The Staff                          |
|         | <p>Academic year—as arranged.</p> <p>Required of Master of Arts and Master of Science candidates.</p>  |                                    |
| 339-40  | <i>Therapeutic Conferences I</i>   | Staff of Pharmacology and Medicine |
|         | <p>Academic year—1 hour a week.</p> <p>Conferences designed to emphasize the application of pharmacological principles to the problems of clinical medicine.</p>   |                                    |



## PHARMACY

Charles Watson Bliven, M.S., *Professor of Pharmacy, Executive Officer*  
Robert Meyer Leonard, Ph.D., *Associate Professor of Pharmacology and  
Pharmacognosy*

Carson Gray Frailey, A.B., LL.B., *Associate Professorial Lecturer on  
Pharmaceutical Law*

Franklin Dero Cooper, M.S., *Assistant Professor of Hospital Pharmacy*

Charles Joseph Kokoski, Ph.D., *Assistant Professor of Pharmacy*

Samuel Meyer Schwartz, Ph.D., *Assistant Professor of Pharmaceutical  
Chemistry*

Gust George Koustenis, B.S. in Phar., *Teaching Fellow in Pharmacy  
Administration*

### SPECIAL LECTURERS

William Paul Briggs, M.S., Sc.D., LL.D., *Executive Director and  
Secretary, American Foundation for Pharmaceutical Education;  
Pharmacy Training*

John Christian Krantz, Jr., Ph.D., *Professor of Pharmacology, Uni-  
versity of Maryland; Pharmacological Research*

Justin Lawrence Powers, Ph.D., *Chairman, Committee on National  
Formulary, American Pharmaceutical Association; Official Drug  
Standards*

Nevis Eugene Cook, B.S., B.S. in Phar., *Assistant to the Commissioner,  
Food and Drug Administration; Drug Control*

Robert Philip Fischelis, B.S., Phar.D., Sc.D., *Secretary and General  
Manager, American Pharmaceutical Association; Pharmaceutical  
Organizations*

PGad Bryan Morehouse, LL.M., A.B., *Assistant General Counsel in  
Charge of Compliance, Federal Trade Commission; Drug Trade  
Regulation*

Louis Edward Kazin, Phar.G., *Associate Editor, Drug Topics; Contem-  
porary Pharmacy*

Karl Bambach, Ph.D., *Executive Vice-President, American Drug Manu-  
facturers Association; Pharmaceutical Industry*

*Bachelor of Science in Pharmacy (School of Pharmacy)*—Prerequisite: the  
Pharmacy curriculum in the Junior College; see pages 67-68. The requirements  
for the degree are stated on pages 151-54.

*Master of Science in Pharmacy (School of Pharmacy)*—Prerequisite: the  
degree or Bachelor of Science from an accredited institution. The requirements  
for the degree are stated on pages 154-57.

## FIRST GROUP

- 1-2 *History and Literature of Pharmacy* (2-1) Bliven  
 Academic year—morning.  
 Orientation in pharmacy; a survey of the development of the evolution of pharmacy and the literature of pharmacy.
- 21-22 *General Pharmacy* (4-4) Kukulski, Cooper  
 First half: fall—lecture (12 hours), laboratory (12 hours)—evening.  
 Second half: spring—lecture (12 hours), laboratory (6 hours)—afternoon.  
 Essential pharmacological reactions; the theory and mechanism of pharmacological and secondary physiological preparations; the pharmacological action of antitubercular, antineoplastic and preparations. Laboratory fee, Pharmacy \$11, Pharmacy \$18.
- 23 *Pharmacognosy* (3) Leonard  
 Fall: lecture (2 hours)—morning, laboratory (3 hours)—evening and afternoon.  
 Microscopic and microscopic. Prescriptions Botany 1. Laboratory fee, \$11.
- 25 *Pharmaceutical Calculations* (3) Bliven  
 Fall—morning.  
 The system of weights and measures and their application in the practice of pharmacy.

## SECOND GROUP

- 101 *Inorganic Pharmaceutical Chemistry* (3) Schwartz  
 Fall: lecture (2 hours)—morning, laboratory (3 hours)—evening.  
 A study of the inorganic methods of preparation, properties and uses of the important inorganic chemicals commonly in pharmacy and medicine. Prescriptions in inorganic chemistry, Chemistry 21. Laboratory fee, \$11.
- 102 *Dispensing Pharmacy* (4) Kukulski  
 Spring: lecture (2 hours), laboratory (6 hours)—evening.  
 Compounding of typical preparations and a study of incompatibilities. Prescriptions, Pharmacy 22, inorganic chemistry, Pharmacy 101. Laboratory fee, \$18.
- 103 *Dispensing Pharmacy* (4) Kukulski  
 Fall: lecture (2 hours)—morning, laboratory (6 hours)—evening.  
 Compounding of Pharmacy fee. Laboratory fee, \$18.

105-6 *Pharmacology I* (2-2)

Leonard

Academic year—afternoon.

The general principles of pharmacology, locally acting drugs: demarcating agents, anesthetics, anesthetic drugs, emetic drugs, vitamins. Prescriptions or treatment registration. Physiology 115.

107 *Pharmacy Accounting* (3)

Koustenis

Fall—morning.

The financial records required in the operation of a pharmacy.

110 *Chemistry and Pharmacy of Medicinal Products* (3)

Schwartz

Spring—morning.

A study of the chemical, structural relationship to action, and some of the clinical and important pharmacological syndromes and natural organic medicinal substances. Prescriptions or treatment registration. Chemistry 152.

111 *Chemistry and Pharmacy of Medicinal Products* (3)

Schwartz

Fall—morning.

A continuation of Pharmacy 110. Prescriptions. Pharmacy 110.

105-66 *Pharmacology II* (3-3)

Leonard

First half fall—morning. Second half spring—lecture (2 hours), seminar, laboratory (4 hours)—discussion.

Drugs acting on the central nervous system, the autonomic nervous system, and on the specific tissue metabolism; diagnostic drugs; biological assays. Prescriptions. Physiology 113 and 117, Pharmacy 105. Pharmacy 105, laboratory for \$15.

107-68 *Pharmacology III* (3-3)

Leonard

First half spring—seminar. Second half—not offered 1977-78.

Laboratory work in pharmacological techniques. Prescriptions. Pharmacy 105. Prescriptions or treatment registration. Pharmacy 105. Laboratory fee, \$15 a semester.

172 *Advanced Dispensing Pharmacy* (1)

Kubacki

Spring—morning.

The study of special problems in dispensing pharmacy. Prescriptions. Pharmacy 105. Laboratory fee, \$15.



- 174 *Quantitative Pharmaceutical Analysis* (3) Bliven, Schwartz  
 Spring: lecture (1 hour), laboratory (6 hours)—morning.  
 Drug analysis. Prerequisite: Chemistry 22. Laboratory fee, \$18.
- 176 *Pharmaceutical Law* (2) Frailey  
 Spring—morning.
- 178 *Pharmacy Management* (4) Koustenis  
 Spring—morning.  
 Policies and operations relating to the management of a pharmacy.
- 182 *Advanced Pharmacology I* (2) Leonard  
 Not offered, 1957-58.  
 Special problems in the field of pharmacology. Prerequisite: current registration, Pharmacy 166.
- 184 *Special Problems in Pharmacy* (411.) Kokeski, Schwartz  
 Fall—as arranged; spring—as arranged.  
 Directed laboratory and library research on special problems in pharmacy and pharmaceutical chemistry. For selected undergraduate students. Prerequisite: Pharmacy 102 and 110. Fees to be arranged.
- 188 *Survey* (1) Bliven and Staff  
 Spring—morning.  
 A symposium covering the various phases of pharmacy.
- 190 *Hospital Pharmacy* (1) Cooper and Staff  
 Spring—morning.  
 Organization and functions of hospitals, organization and operation of a hospital pharmacy, professional and nonprofessional supplies. Prerequisite: Pharmacy 102.
- 192 *Hospital Pharmacy: Prescription Practice* (1) Cooper  
 Fall—as arranged; spring—as arranged; summer 1957.  
 Prescription practice in the University Hospital Pharmacy. Prerequisite: Pharmacy 102.
- 194 *Manufacturing Pharmacy* (3) Cooper  
 Lecture (1 hour), laboratory (6 hours). Fall—as arranged; spring—as arranged; summer 1957.  
 The manufacture of bulk pharmaceuticals in the University Hospital Pharmacy. Elective for seniors.



## THIRD GROUP\*

- 201-2 *Survey of Pharmaceutical Literature* (1-1) The Staff  
Assigned library research on the development of pharmaceutical literature.
- 203-4 *Special Problems in General Pharmacy* (2-2) Kokoski  
Investigations of problems involved in the manufacture of pharmaceutical preparations on a laboratory scale. Laboratory fee \$18 a semester.
- 206 *Pharmaceutical Technology* (4) Kokoski, Cooper  
Lecture (2 hours); laboratory (6 hours)  
A study of advanced manufacturing pharmacy, including formula development for the different types of preparations. Laboratory fee, \$18.
- 215-10 *Advanced Pharmacology II* (3-3) Leonard  
Lecture (1 hour); laboratory (2 hours)  
System studies on biological assay methods. Laboratory fee, \$18 a semester.
- 221-22 *Chemistry of Naturally Occurring Organic Medicinal Products* (5-5) Schwartz  
Lecture (1 hour); laboratory (4 hours)  
A study of the isolation, chemistry, and relationship between the constitution and pharmacologic action of alkaloids, tannins, resins, terpenoids, carbohydrates, glycosides, and the various biological products. Laboratory fee, \$18 a semester.
- 223-24 *Chemistry of Synthetic Organic Medicinal Products* (5-5) Schwartz  
Lecture (1 hour); laboratory (4 hours)  
A study of the chemistry and relationship between the structure and important action of narcotics and their derivatives, nitrogen compounds, organic compounds, sulfur compounds, and organometallic compounds. Laboratory fee, \$18 a semester.
- 226 *Determination of Physical Constants* (2) Schwartz  
Lecture (1 hour); laboratory (1 hour)  
A laboratory and lecture study of the determination of physical constants of medicinal products. Laboratory fee, \$18.

\* Courses in this group are not offered in 1957-58.

- 228 *Food and Drug Analysis* (4) Schwartz, Bliven  
Lecture (2 hours); laboratory (6 hours).  
A study of the composition of some common foods and food products. Laboratory fee, \$18.
- 231 *Pharmacology of Anesthetic Drugs* (4) Leonard  
Theoretical consideration of the principles of anesthesiology and laboratory study of the action of anesthetic drugs. Laboratory fee \$18.
- 234 *Pharmacology of Autonomic Drugs* (4) Leonard  
A study of action and interaction of drugs principally influencing the autonomic nervous system. Laboratory fee, \$18.
- 236 *Experimental Toxicology* (4) Leonard  
Pharmacological action of toxic drugs correlated with chemical and pathological studies. Laboratory fee, \$18.
- 251-52 *Graduate Seminar* (1-1) The Staff  
Current problems and trends in pharmacy. Required of all students registered for the Master's degree.
- 295-96 *Research and Thesis* (arr.) The Staff  
Investigation of special problems in the major field of interest and thesis preparation. Semester hours (not to exceed 6) and fees to be arranged.

## PHILOSOPHY

Charles Edward Gauss, Mus.B., Ph.D., *Elton Professor of Philosophy*,  
*Executive Officer*

Richard Harold Schlagel, Ph.D., *Assistant Professor of Philosophy*

*Bachelor of Arts with a major in Philosophy (Columbia College—Faculty Studies)—Prerequisite: the Arts and Letters curriculum in the Junior College (see page 56).*

Required, in addition to the general requirements stated on pages 84-86, the grade of "pass" for the Philosophy major examination at the end of the senior year. The intellectual knowledge with which the student will be examined is summarized under the following general headings: (1) history of philosophy; (2) logic and theory of knowledge; (3) social philosophy. The Department of Philosophy provides a commentary (Philosophy 110-112) intended to assist the student in preparing himself for his senior examination.

*Master of Arts in the Field of Philosophy (Columbia College)—Prerequisite: an undergraduate major in Philosophy at this University or the equivalent as attested by the results of this University's major examination in Philosophy; the following specific courses or the equivalent: Philosophy 110-112, 113, 121-22, and 131.*

Required, the general requirements as stated on pages 87-91. As much as possible of the required twenty-four semester hours of course work should be in third-group courses. Students electing second-group courses are expected to do more intensive work than is demanded of undergraduates. A general written examination on the problems of the field of Philosophy and a departmental oral examination are required.

### FIRST GROUP

- 51-52 *Introduction to Philosophy (3-3)* The Staff  
 Academic year—morning and evening; summer 1957—Philosophy 51/52.  
 A critical introduction to the problems of modern philosophy in relation to scientific and social developments since the Renaissance.

### SECOND GROUP

- 111-12 *History of Philosophy (3-3)* Gauss  
 Academic year—morning; summer 1957—Philosophy 112/51.  
 History of western philosophy from Thales to Kant.  
 113 *History of Nineteenth and Twentieth Century Philosophy (3)* Gauss  
 Fall—morning.  
 A history of ideas and influences explaining contemporary thought.

- 121-22 *Logic and Scientific Method* (3-3) Schlager  
Academic year—evening.  
The study of formal logic and the means of investigation and description employed in the sciences; theory of scientific inference and prediction.
- 131 *Ethics* (3) Schlager  
Fall—evening.  
An examination of ethical theories, the relation of ethics to social science and psychology.
- 142 *Philosophies Men Live by* (3)  
Not offered 1957-58  
The influence upon contemporary personal and social problems of the great eastern and western philosophies which have served as guide for everyday living and moulded man's cultures and institutions.
- 152 *Epistemology* (3) Schlager  
Spring—evening.  
Examination of problems related to perception, verification, nature and criteria of truth, difference between *a priori* and *a posteriori* statements, universals, the concept of mind.
- 162 *Aesthetics* (3) Gauss  
1958-59 and alternate years.  
The problems of appreciation and judgment in the arts, and of theories of the process of artistic creation. Emphasis on contemporary arts and criticism.
- 171-72 *American Philosophy* (3-3)  
Not offered 1957-58  
A general history of philosophy in the United States, correlated with the development of American thought.
- 180 *Philosophy of History* (3) Gauss  
Spring—morning.  
Problems of historical knowledge and explanation. Critique of philosophy of history.
- 193 *Topics in Contemporary Philosophy* (3) Schlager  
Summer 1957



- 199-200 *Proseminar: Readings for the Major* (3-3) The Staff  
Academic year—evening.  
Conferences and group discussions.

## THIRD GROUP

- 201-2 *Readings and Research* (3-3) The Staff  
Academic year—as arranged.  
Advanced readings and reports. Investigation of special problems.
- 211-12 *Seminar in Plato and Aristotle* (3-3)  
1958-59 and alternate years.
- 213-14 *Seminar in Seventeenth and Eighteenth Century  
Philosophy* (3-3) Gauss  
*First half*, fall—evening. *Second half*—not offered 1957-58.  
Topic for full semester: Descartes and Locke.
- 216 *Seminar in Kant* (3) Schlagel  
Spring—evening.
- 299-300 *Thesis* (3-3) The Staff

## PHYSICAL EDUCATION FOR MEN\*

William Henry Myers, A.M., *Professor of Physical Education for Men*  
Joseph Henry Krupa, M.S., Ed.D., *Professor of Physical Education for Men, Executive Officer*

Milo Frederick Christensen, B.S., M.R., *Professorial Lecturer in Physical Education*

Jackson Moore Anderson, Ph.D., *Professorial Lecturer in Physical Education*

Raymond George Hanken, B.S. in P.E., A.M. in Ed., *Associate Professor of Physical Education for Men*

Vincent James DeAngelis, B.S. in P.E., A.M. in Ed., *Associate Professor of Physical Education for Men*

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William Jennings Reinhart, B.B.A., *Associate in Physical Education for Men*

Eugene Hughey Sherman, Sr., B.S., *Associate in Physical Education for Men*

This department includes all the recognized athletic activities of the men students of the University.

Two years of Physical Education (Physical Education 1-2 and 11-12) are required of all men for graduation, except those students exempt under the regulations stated on pages 50-51.

Upon entering the University, all freshmen or other undergraduate students who have not passed the Physical Education requirements are given a medical examination. Amendments for medical examinations will be given at the time of registration. The students who satisfy the requirements of the medical examination are then given a physical efficiency test in the general body, ability of body endurance and strength, and in swimming. If the physical efficiency test is passed, the student may choose from the following list of activities:

Setting up Exercises (stretching exercises)

Body Building Exercises (gymnastic apparatus and weight training skills)

Competitive games and sports

Swimming (beginner, intermediate, advanced, life saving)

If the physical efficiency test is not passed, the student will be assigned to a class for training in the above activities in the order listed.

The Department furnishes gymnasium uniforms and personal equipment upon receipt of a receipt for same.

*Backlog of Science in Physical Education (School of Education)*—Prerequisite: the Physical Education for Men curriculum in the Junior College, see page 60. The requirements for the degree are stated on pages 150-62 and 170-71.

\*The University is not responsible for injuries received in unsupervised or individual games, or in any of the activities of the Departments of Physical Education, and the student assumes full responsibility therefor.

## FIRST GROUP

- 1-2 *Freshman Physical Education* (1-1) The Staff  
 Academic year—as arranged  
 Two periods of supervised activity a week. Locker and towel fee.\*  
 \$4.50 a semester.
- 11-12 *Sophomore Physical Education* (1-1) The Staff  
 Academic year—as arranged  
 Two periods of supervised activity a week. Locker and towel fee.\*  
 \$4.50 a semester.
- 43-44 *Techniques of Physical Education  
 Motor Activities* (2-2) DeAngelis, Krupa  
 Academic year—spring  
 Fundamental skills, rules, and organization. Locker and towel fee.\*  
 \$4.50 a semester.
- 45-46 *Methods and Materials for Teaching  
 Individual and Dual Sports in  
 Secondary Schools* (2-2) Hanken, Krupa  
 Academic year—spring  
 Tennis, golf, swimming, wrestling, ballminton, bowling. Locker and  
 towel fee.\* \$4.50 a semester.
- 47 *Introduction to Physical Education* (2) Myers  
 Fall—winter  
 An orientation course presenting the problems of physical education,  
 vocational analysis, scientific fundamentals, and people of field.
- 48 *Introduction to Recreation* (2) Hanken  
 Spring—as arranged  
 The role of recreation in modern living, current practices in com-  
 munity recreation work, standards of training, experience, and salary;  
 types of leadership.
- 49 *Human Anatomy* (3) Stallings  
 Fall—winter  
 The structure of the human body. Basic course for physical education  
 majors. Also useful to both men and women not majoring in Physical  
 Education. Prerequisite: Biology 1-2 or Zoology 1-2.

\* The locker and towel fee is required for registration in one or more of the activity courses.

50 *Kinesiology* (3)

Lawrence

Spring—morning.

A study of the anatomical mechanism of movement, analysis of the action of muscles in physical education activities. Prerequisite: an approved course in anatomy.

58 *First Aid and Care of Athletic Injuries* (2)

DeAngelis, Lawrence

Spring—morning.

Prevention and emergency care of injuries of all types, with special reference to first aid, first defense, bandaging, and massage. A practical course. Prerequisite: Biology 1-2 or Zoology 1-2.

## SECOND GROUP

101 *Physical Education in the Elementary School* (3)

Atwell, Burtner

Fall—afternoon and evening

Physical growth and development of the child and adolescent. Survey of age characteristics and organization of physical education instruction for the various age levels in elementary school, college, and settlement house programs. Methods and materials of tumbling, games, dance, and self-defense activities.

103 *History and Principles of Physical Education* (3)

Atwell, Krupa

Fall—morning.

Survey of history as it relates to contemporary physical education. Study of aims, objectives, and philosophy of physical education.

103-6 *Adapted Physical Education and Physical Examinations* (3-5)

Lawrence

Aademic year—morning

Cause and correction of faulty body mechanics, physical examination methods for the diagnosis of physical defects, prescription of exercises and program adaptation. Prerequisite: Physical Education 49 and 50.

107 *Techniques for Teaching Recreational Dance* (1)

Fall—morning

Methods and materials for teaching the country and social dances of America and the folk dances of other countries to elementary school age and adult groups. Square dance calling is included. Locker and towel fee,\* \$4.50.

\* The locker and towel fee is required for registration in one or more of the activity courses.



- 110-112 *Leadership Organization in the Intramural Program* (2-2) DeAngelis  
Academic year—afternoon.  
Principles of administration, organization, and supervision of intramural activities in the physical education program of the junior high school, senior high school, and college.
- 113-114 *Methods and Practice in Teaching Physical Education Activities* (2 to 4-2 to 4) Hanken and Staff  
Academic year—semester.  
Principles and methods applied to learning and teaching physical education activities. Supervised laboratory. Locker and towel fee.\* \$4.50 a semester.
- 115-116 *Methods and Materials for Teaching Team Sports in Secondary Schools* (2 to 4-2 to 4) DeAngelis, Hanken  
Academic year—morning.  
Football, basketball, baseball, track and field. Locker and towel fee.\* \$4.50 a semester.
- 117 *Methods of Teaching Modern Dance* (1 to 2) Burtner  
1958-59 and alternate years.  
Techniques for the teaching of movement as a medium of expression. Practical work in body technique, composition, and the analysis of contemporary and classic dances including instrumental, mime, and pantomime. Application is made to both secondary school and adult levels. Locker and towel fee.\* \$4.50.
- 118 *Dance Production* (1 to 2) Burtner  
1958-59 and alternate years.  
Choreography for dance concerts, musicals, and plays. The planning and staging of dance for TV, adult symposiums, and film festivals. Lighting, costume, sets, making the dance performance. Locker and towel fee.\* \$4.50.
- 121 *School and Community Health Programs* (3) Krupa and Staff  
Fall—afternoon.  
Health services, healthful environment, health inspection, sources of material for general health knowledge. Prerequisite: Biology 1-2 or Zoology 1-2.

\* The locker and towel fee is required for registration in one or more of the activity courses.

- 122 *Methods and Materials for Health Education* (3) Atwell  
Spring—evening  
Methods and materials for teaching health at each age level. Prerequisites: Biology 1-2 or Zoology 1-2.
- 131 *Tests and Measurements in Physical Education* (3) Krupa  
Fall—morning  
Critical survey of tests in physical activities, methods of test construction, elementary statistics.
- 132 *Camp Leadership* (1) Atwell, Stallings  
Spring—afternoon  
Survey course in camp counseling.
- 133-34 *Observation and Student Teaching* (3-3 to 6) Atwell, Myers  
(3-3 to 6)  
First half fall and spring—unarranged. Second half fall and spring—unarranged.  
Appointments are made to schools in Washington and the system. Physical Education 134 student teaching for 25.
- 136 *Survey of Dance History and Dance Forms* (3) Bartner  
Spring—evening  
The development of dance from prehistoric times to present day, modern and post-modern dance. Includes study of dance practice and theories of fundamental movement techniques, and composition.
- 138 *Organization and Administration of Physical Education* (3) Atwell, Myers  
Spring—evening  
Organization and administration of physical education programs in elementary and secondary schools and in colleges. Study of physical facilities, equipment, and programs.
- 151-52 *Recreational Leadership Activities* (1 to 3-1 to 3) Christiansen  
1957-58 and alternate years—winter, year—evening  
Fall semester: basic skills for the physical and kinesthetic child. Fall semester: practice in crafts, games, dramatics, physical and social games. Spring semester: basic skills for the non-art and adult child. Art and crafts, dramatics, physical and social activities.

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- 101 *Community Organization for Recreation* (3)      Anderson  
1958-59 and alternate years.  
Resources, principles, and methods in organizing community recreation  
service.
- 102 *Administration of Community Recreation  
Programs* (3)      Anderson  
1958-59 and alternate years.  
Factors and problems in administering recreation including surveys,  
legislation, program, area, facilities, leadership, finance, and public  
relations.

## PHYSICAL EDUCATION FOR WOMEN\*

Ruth Harriet Atwell, A.M., *Professor of Physical Education for Women, Executive Officer*

Helen Bennett Lawrence, A.M., *Professor of Physical Education for Women*

Elizabeth Burtner, A.M., *Professor of Physical Education for Women*

Loretta May Stallings, A.M., *Assistant Professor of Physical Education for Women*

Camille Jacob Craig, B.S., in P.E., A.M., *Assistant Professor of Physical Education for Women*

\_\_\_\_\_, *Instructor in Physical Education for Women*

Mabel McEwan, A.B., *Associate in Physical Education for Women*

Two years of Physical Education (Physical Education 1-2 and 11-12) are required of all women for graduation, except students exempt under regulations stated on pages 5-51. In the fall a complete medical and physical examination is given each student for the purpose of determining individual needs. Those students whose examinations indicate the desirability of remedial or restricted activity are assigned to a program especially adapted to their needs. This limited program includes moderate sports and individual exercises in small groups under careful supervision.

The required costume for Physical Education classes may be purchased at the University Book Store.

*Bachelor of Science in Physical Education (School of Education).*—Prescribes the Physical Education for Women curriculum in the Junior College regulations for 7. The requirements for the degree are stated on pages 111-12 and 171-71.

Within the curriculum leading to the degree of Bachelor of Science in Physical Education, there is opportunity for specializing in dance, sports, activities, or recreation.

### FIRST GROUP

#### 1-2 Freshman Physical Education (1-1)

The Staff

Academic year, fundamentals of health and physical education—morning and afternoon, activity—morning and afternoon.

One period of fundamentals of health and physical education and two periods a week chosen from the activities offered each semester.

Fundamentals of health and physical education: one semester on study of the factors involved in the general maintenance of health; efficient use of the body; and fundamentals of movement, one semester or fundamentals of dance.

Activities: basketball, basketball, body mechanics, swimming, field hockey, folk and square dance, golf, modern dance, riding, skating, swimming, synchronized swimming, tennis. Locker and towel fee \$1.50 a semester.

\* The University is not responsible for injuries received in intercollegiate or intramural games or in any of the activities of the Department of Physical Education, and no student receives any compensation therefor.

† The locker and towel fee is required for registration in one or more of the activity courses.



- 11-12 *Sophomore Physical Education* (1-1) The Staff  
Academic year—two periods a week—morning and afternoon.  
Two periods a week chosen from the activities offered each season as listed under Physical Education 1-2. Locker and towel fee.\* \$4.50 a semester.
- 43-44 *Techniques of Physical Education Motor Activities* (2-2) The Staff  
Academic year—as arranged.  
Fundamental skills, rules, and examination. Locker and towel fee.\* \$4.50 a semester.
- 47 *Introduction to Physical Education* (2) Myers  
Fall—morning.  
An orientation course presenting the problems of physical education, vocational analysis, scientific foundations, and some of field.
- 48 *Introduction to Recreation* (2) Hanken  
Spring—as arranged.  
The role of recreation in modern living, current practices in community recreation work, standards of training, experience, and salary; types of leadership.
- 49 *Human Anatomy* (3) Stallings  
Fall—morning.  
The structure of the human body. Basic course for physical education majors. Also open to both men and women not majoring in Physical Education. Prerequisite: Biology 1-2 or Zoology 1-2.
- 50 *Kinesiology* (3) Lawrence  
Spring—morning.  
A study of the mechanical mechanism of movement; analysis of the action of muscles in physical education activities. Prerequisite: an approved course in anatomy.
- 51-52 *Methods and Materials for Teaching Physical Education Activities in Secondary Schools and Colleges* (2-2) The Staff  
1957-58 and alternate years; Academic year—as arranged.  
Team sports: basketball, hockey, softball, soccer, football, volleyball. Individual and dual sports: Tennis, tennis, golf, archery, canoeing, swimming and diving, freestyle, and water skiing, artistic and tumbling. Group exercises. Trampoline. Locker and towel fee.\* \$4.50 a semester.

\* The locker and towel fee is required for registration in one or more of the activity courses.

58 *First Aid and Care of Athletic Injuries* (2) DeAngelis, Lawrence

Spring—morning.

Prevention and emergency care of injuries of all types, with special reference to first aid (civ) lesions, lacerations, and fractures. A practical course. Prerequisite: Biology 1, 2 or Physiology 1, 2.

SECOND GROUP

101 *Physical Education in the Elementary School* (3) Atwell, Bortner

Fall—afternoon and evening.

Physical growth and development of the child and adolescent. Survey of the characteristics and organization of physical education activities for the various age levels in elementary school, playground, and settlement house programs. Methods and materials of tumbling, games, dance, and self-testing activities.

103 *History and Principles of Physical Education* (3) Atwell, Krupa

Fall—morning.

Survey of history as it relates to contemporary physical education. Study of aims, objectives, and philosophy of physical education.

105-6 *Adapted Physical Education and Physical Examinations* (3-3) Lawrence

Academic year—morning.

Cause and correction of faulty body mechanics, physical examination methods for the diagnosis of postural defects, preparation of exercises, and program construction. Prerequisite: Physical Education 49 and 50.

107 *Techniques for Teaching Recreational Dance* (1)

Fall—morning.

Methods and materials for teaching the square and round dances of America and the folk dances of other countries to children, school age and adult groups. Square-dance caller is included. Locker and towel fee \* \$4.50.

109-10 *Leadership Organization in the Intramural Program* (2-2) DeAngelis

Academic year—afternoon.

Principles of administration, organization, and supervision of intramural activities in the physical education program of the senior high school, junior high school, and college.

\* The locker and towel fee is required for participation in one or more of the games included.

111-12 *Methods and Materials for Teaching Physical Education Activities in Secondary Schools and Colleges* (1 to 2-1 to 2) The Staff

1958-59 and alternate years

Contribution of methods and materials in activities listed under Physical Education 21-32. Locker and towel fee.\* \$4.50 a semester

113-14 *Methods and Practice in Teaching Physical Education Activities* (2 to 4-2 to 4) The Staff

Academic year—as arranged

Principles and methods applied in learning and teaching physical education activities. Successful laboratory. Locker and towel fee.\* \$4.50 a semester

117 *Methods of Teaching Modern Dance* (1 to 2) Burtner

1958-59 and alternate years

Techniques for the teaching of movement as a medium of expression. Physical work in body technique, improvisation, and the nature of a requirement for dance, including movement, rhythm, and composition. Attention is made to both elementary and advanced levels. Locker and towel fee.\* \$4.50

118 *Dance Production* (1 to 2) Burtner

1958-59 and alternate years

Classroom study for dance, costumes, methods, and props. The planning and production of dance for TV, group demonstrations, and folk festivals. Learning costumes, sets, make-up for dance performances. Locker and towel fee.\* \$4.50

121 *School and Community Health Programs* (3) Krupa and Staff

Fall—afternoon

Health services, healthful environment, health instruction, sources of material for general health knowledge. Precedence: Biology 1-2 or Zoology 1-2

122 *Methods and Materials for Health Education* (3) Atwell

Spring—evening

Methods and materials for teaching health at each age level. Precedence: Biology 1-2 or Zoology 1-2

131 *Tests and Measurements in Physical Education* (3) Krupa

Fall—evening

Critical survey of tests in physical education, methods of test construction, descriptive statistics

\* The locker and towel fee is required for participants in one or more of the above courses



- 132 *Camp Leadership* (1) Atwell, Stallings  
Spring—afternoon  
Survey course in camp conduct.
- 133-34 *Observation and Student Teaching* Atwell, Myers  
(3-3 to 6)  
Academic year—overseas.  
Assignments are made to schools in Washington and the vicinity.  
Physical Education 134, student teaching fee, \$5.
- 136 *Survey of Dance History and Dance Forms* (3) Burtner  
Spring—evening  
The development of dance from primitive times to present day contemporary and old types of the dance. Includes ethnology, social customs and dance of the elements, movement techniques, and composition.
- 138 *Organization and Administration of Physical Education* (3) Atwell, Myers  
Spring—evening  
Organization and administration of physical education programs in elementary and secondary schools and in colleges. Study of physical habits, equipment, and programs.
- 151-52 *Recreational Leadership Activities* Christensen  
(1 to 3-1 to 3)  
1957-58 and alternate years—morning year—evening  
Fall semester: basic skills for the preschool and school age child. Fall semester: games for adults, youth, dramatics, physical and social activities. Spring semester: basic skills for the business and adult. Adult and youth, dramatics, physical and social activities.
- 161 *Community Organization for Recreation* (3) Anderson  
1958-59 and alternate years  
Reasons, principles, and methods in organizing community recreation services.
- 162 *Administration of Community Recreation Programs* (3) Anderson  
1958-59 and alternate years  
Factors and problems in administering recreation including security, legislation, program, area, facilities, leadership, finance, and youth relations.



## PHYSICAL MEDICINE AND REHABILITATION

Charles Samuel Wise, B.S., M.D., *Professor of Physical Medicine and Rehabilitation, Executive Officer*

Francis Llewellyn Wenger, B.S., M.D., *Assistant Clinical Professor of Physical Medicine and Rehabilitation*

Alvin Knudson, B.S., M.D., *Associate in Physical Medicine and Rehabilitation*

Charles Jerome Everding, B.S., M.D., *Clinical Instructor in Physical Medicine and Rehabilitation*

### 150 *Elements of Physical Medicine*

The Staff

Semester arranged.

In arrangement with the Anatomy Department, lectures and demonstrations in the various tests and measurements are employed in the evaluation of physical disability.

### 352 *Advanced Physical Medicine*

The Staff

Semester I hour a week.

Lectures and demonstrations concerning the various techniques, physical applications of physical medicine and rehabilitation to be correlated with the teaching of the associated medical and surgical specialties.

### 467-68 *Clinical Studies*

The Staff

Academic year—arranged.

Clinical teaching and demonstration at the University Hospital.

### 485 *Research* (arr.)

The Staff

Fall—arranged.

Open to medical students and specially qualified graduate students.

## PHYSICS

Thomas Benjamin Brown, Ph.D., *Professor Emeritus of Physics in Residence*

George Martin Koehl, A.M., *Professor of Physics*  
 Lewis Slack, Ph.D., *Professor of Physics, Acting Executive Officer*  
 Clyde Lorrain Cowan, Jr., Ph.D., *Professor of Physics*  
 Nicholas Golovin, Ph.D., *Associate Professorial Lecturer in Physics*  
 John Lyle Prather, A.B., *Assistant Professor of Physics*  
 Albert Prentice Kenyon, A.M., *Lecturer in Physics*  
 John Newell Tevis, A.M., *Lecturer in Physics*  
 DeWitt Fisher, A.M., *Lecturer in Physics*  
 John May Harrison, M.S., *Lecturer in Physics*  
 Merwin Bishop Forbes, A.M., *Associate in Physics*  
 John Ettinger Tompkins, A.M., *Associate in Physics*

*Bachelor of Arts or Bachelor of Science with a major in Physics (Columbia College—Department)*—Prerequisite: the Arts and Letters or the Science curriculum, respectively, in the Junior College, and pages 6-7. The following courses must be included: Physics 5, 6, 7, 8, and 55; Chemistry 21; Mathematics 19 and 22.

Required, for both the Bachelor of Arts degree and the Bachelor of Science degree, the general requirements as stated on pages 8-86, including Mathematics 142 and Physics 101, 105, 126, 113, 112, and 135 or 136, plus one of the following: Physics 112, 114, 118, 123, and 128.

*Master of Arts or Master of Science in the Field of Physics (Columbia College)*—Prerequisite: the degree of Bachelor of Arts or Bachelor of Science, respectively, with a major in Physics at the University, or the equivalent. Required: the general requirements as stated on page 87-91. The thirty hours of required work must include Mathematics 171 (if not taken earlier) and Physics 111-12, 235 or 236, and 241-42.

*Doctor of Philosophy (Graduate Council)*—See page 96.

*Bachelor of Science in Engineering with an option in Physics (School of Engineering)*—For requirements, see pages 137-39, 141-42.

*Bachelor of Arts in Education with a thinking add in Physics (School of Education)*—Prerequisite: the Education curriculum, page 68.

Required: the Physics option, page 148, and the professional courses listed on pages 149-7.

### FIRST GROUP

5 *General Physics* (3) Koehl, Prather, and Staff

Lecture (1 hour), recitation (1 hour), laboratory (1½ hours)

Fall—morning, afternoon, and evening. Spring—lecture—morning and

evening; recitation—morning, afternoon, and evening; laboratory—morning, afternoon, and evening. Summer 1957.

An introduction to the phenomena of light, heat, force, energy, and the properties of matter. This course may be taken as a terminal course by non-science students who want an introduction to the physical sciences. Prerequisite: high school algebra and plane geometry. Material fee, \$11.

#### 6 *General Physics* (3) Kochl and Staff

Spring semester (1 hour), summer (1 hour), laboratory (2½ hours)—morning, afternoon, and evening; summer 1957.

Mechanics, wave-motion, and sound. Prerequisite: Physics 5; high school algebra and plane geometry. Material fee, \$11.

#### 7 *General Physics* (3) Brown and Staff

Fall semester (1 hour), summer (1 hour), laboratory (2½ hours)—morning, afternoon, and evening; summer 1957.

Electricity, magnetism, and light. Prerequisite: Physics 5; high school algebra and plane geometry. Material fee, \$11.

#### 8 *General Physics* (3) Brown, Prather, and Staff

Spring—summer and evening; summer 1957.

This course is the fourth in the sequence of courses 4, 5, 7, and 8, and emphasizes the concepts involved in fundamental principles studied in courses 4, 5, and 7, and the phenomena and theory of modern physics. Topics included include electromagnetism, wave-light, radio and X-rays, atomic and molecular structure, radioactivity, cosmic physics, the quantum theory of matter and particles, and the elementary particles such as neutrinos, protons, neutrons, and mesons. Prerequisite: Physics 5 and 7.

#### 55 *Physical Measurements* (3) Stock and Staff

Fall semester (2 hours), laboratory (1 hour)—afternoon and evening.

Theory and methods of physical measurement in the natural fields of physics. Prerequisite: Physics 6 and 7; Mathematics 12. Material fee, \$11.

### SECOND GROUP

#### 131 *Mechanics* (3) Kochl

1957-58 and alternate years; fall-summer; 1958-59 and alternate years; fall-summer.

motion, kinematics, dynamics of solids and fluids, and gravitation. Prerequisite: Trigonometry, Mathematics 20.

- 102 *Heat and Thermodynamics* (3) Prather  
1957-58 and alternate years: fall—evening.  
Fundamental concepts, heat transfer, the laws of thermodynamics with applications to physical systems. Prerequisites: Physics 8, Mathematics 20.
- 105 *Principles of Electricity* (3) ———  
1957-58 and alternate years: fall—evening, 1958-59 and alternate years: fall—morning.  
Elementary d.c. and a.c. circuit theory, electric and magnetic fields, dielectric and magnetic materials, motion of charged particles in electric and magnetic fields. Prerequisites: Physics 8, Mathematics 20.
- 106 *Optics* (3) Koehl  
1957-58 and alternate years: spring—morning, 1958-59 and alternate years: spring—evening.  
Geometrical optics, elementary theory of wave motion, interference, diffraction, polarization, and dispersion of light, laws of low-frequency radiation. Prerequisite: Physics 8, Mathematics 20.
- 113 *Atomic Physics* (3) Cowan  
1957-58 and alternate years: fall—evening, 1958-59 and alternate years: fall—morning.  
Properties of elementary particles, interactions with radiation, atomic structure, spectral and X-ray spectra, introduction to wave mechanics. Prerequisite: Physics 8, Mathematics 20.
- 114 *Statistical Physics* (3) Prather  
Spring—evening.  
Classical and quantum statistics with emphasis on Maxwell-Boltzmann statistics; application to kinetic theory of gases, quantum statistics, specific heats of gases and solids. Prerequisites: Physics 8, Mathematics 20.
- 118 *Introduction to Solid State Physics* (3) ———  
Spring—evening.  
Dielectric and magnetic properties of solids, electron theory of metals, semiconductors, dielectrics, and plastic flow. Prerequisite: Physics 113, Mathematics 20.
- 123 *Nuclear Physics* (3) Cowan  
Spring—evening.  
Structure and stability of atomic nuclei, nuclear transformations and reactions, radiation of nuclei, fission. Prerequisite: Physics 113.



128 *Sound* (3)

Slack

1957-58 and alternate years—spring—evening

Production, propagation, and detection of sound waves; vibrations of continuous bodies; acoustic instruments and acoustic measurements. Prerequisite: Physics 8. Material fee, \$11.

132 *Electronics* (3)

Brown and Staff

Spring: lecture (2 hours), laboratory (3 hours)—morning and evening.

The phenomena of electron emission from solids, the physical properties of vacuum tubes, and the principles underlying tube-based applications. Prerequisite: Physics 8 and 35, and a course in d.c. and a.c. circuits or Principles of Engineering. Material fee, \$11.

138 *Transistor Principles and Circuits* (3)

Oakes, Karp

Summer 1957.

Qualitative description of transistor action; introduction to transistor circuit analysis; low frequency—triode, phase inverter; high frequency equivalent circuits; tubes and transistors compared; amplified devices, tubes and non-linear networks. Prerequisite: Physics 132 or the equivalent.

141 *Electromagnetic Waves* (3)

Brown

Not offered 1957-58.

Electromagnetic theory for light and radio waves, including an introduction to guided waves and gravity radiation. Prerequisite: Physics 1-5 and Mathematics 112, or the equivalent.

153 *Laboratory in Atomic Physics* (3)

Brown

Fall: Saturdays—as arranged; Spring: Saturdays—as arranged.

Prerequisite: Physics 8, 55. Material fee, \$11.

155 *Advanced Laboratory in Electricity and Magnetism* (3)

Brown

Fall: Saturday—as arranged; Spring: Saturday—as arranged.

Prerequisite: Physics 55, 105. Material fee, \$11.

156 *Advanced Laboratory in Optics* (3)

Brown

Fall: Saturday—as arranged; Spring: Saturday—as arranged.

Prerequisite: Physics 55, 106. Material fee, \$11.

191 *Nuclear Reactors* (3)

Golovin

Fall—evening.

Neutron physics: sources of neutrons, neutron reactions, slowing down and diffusion, introduction to transport theory. Basic prompt reactor theory: basic theory of homogeneous and heterogeneous reactors, including specific numerical studies from recent publications. Prerequisite: Physics 8; Mathematics 20.

## THIRD GROUP

211 *Classical Physical Theory* (3)

Slack

Fall—evening.

Dynamics of systems of particles and of rigid bodies, generalized coordinates. Prerequisite: Physics 101; Mathematics 132, 171 (Mathematics 171 may be taken concurrently.)

212 *Classical Physical Theory* (3)

Slack

Spring—evening.

Classical non-relativistic field theory with applications to electrostatic and hydrodynamic fields. Prerequisite: Physics 101 and 103; Mathematics 152, 171.

219-21 *Wave Mechanics* (3-3)

Academic year—evening.

Criticism of classical ideas of mechanics and a formulation of wave-mechanical equations; matrix mechanics and its relation to wave mechanics; applications to various problems of atomic, molecular, and nuclear physics. Prerequisite: Physics 111, 113, 211.

222 *Quantum Electrodynamics and Field Theories* (3)

Not offered 1957-58.

Relativistic wave equations, quantization of electromagnetic fields, interaction between matter and radiation, elementary particles and their transformations. Prerequisite: Physics 110-02.

227 *Statistical Thermodynamics* (3)

Not offered 1957-58.

Advanced formulation of thermodynamics. Thermodynamic potentials and equations. The method of  $\delta Z$  (Gibbs). Statistical theory based on microcanonical theory of particles. Bose-Einstein and Fermi-Dirac statistics. Applications to radiation, electrons, etc. Prerequisite: Physics 102, 114; Mathematics 132.

236 *Electrical Conduction in Gases* (3)

Brown

Not offered 1957-58.

Fundamental theory and principal applications. Ionization currents, Townsend currents, and photo currents; ion shields and probe measurements, glow discharges, sparks, luminous discharges, counter tubes, glow lamps, thyratrons, and neon signs. Prerequisite: Physics 132.

255-56 *Graduate Laboratory* (4-4)

Brown

Academic year: Saturdays—as arranged.

Individual work on special topics. One semester of this course is required of all Master's candidates in Physics. Students complete this course only in conjunction with Physics 255 or 256. Not open to undergraduates. Material fee, \$11 a semester.

291-92 *Seminar: Recent Developments in Physics*  
(1-1)

The Staff

Academic year: alternate weeks—Monday evening.

Individual investigations of special problems. All students registered for a Master's degree in physics are expected to attend this seminar during residence for the degree, and to take 191 in its honorarium. Credit for participation in the seminar work is obtained by registering for this course during the first two semesters of residence. This credit, however, is based upon the seminar work during the entire period of residence.

299-300 *Thesis* (3-3)

The Staff

Academic year—as arranged.

Fees to be arranged.

## PHYSIOLOGY

Chester Elwood Leese, Ph.D., *Fry Professor of Physiology, Executive Officer*

William Rankin Duryee, Ph.D., *Research Professor of Physiology*

Joseph William Still, M.D., M.P.H., *Assistant Professor of Physiology*

Habeeb Baechus, Ph.D., M.D., *Assistant Research Professor of Physiology*

Wallace Lane Chan, A.B., M.D., *Assistant Research Professor of Physiology*

Hyman Erwin Steinman, M.D., *Lecturer in Physiology*

Tal Gordon Hiebert, Ph.D., *Lecturer in Physiology*

Charles Arthur Toompas, A.M., *Instructor in Physiology*

Louis Pat Munan, M.S., *Associate in Physiology*

Francis DeSales Woidich, B.S., M.D., *Associate in Physiology*

*Master of Arts or Master of Science in the field of Physiology (Columbia College).—Prerequisite: the degree of Bachelor of Arts or Bachelor of Science, respectively, with a major in Biology, Chemistry, Physics, or Zoology from this University, or the equivalent. The undergraduate work should include the equivalent of Biology 1-4 or Zoology 1-2, and Zoology 41-42, Chemistry 11-12, 21, 131-32, Physics 5, 6, and 7. It is recommended that Physiology 221-22 be taken as an elective. A Bachelor's degree which includes the prescribed requirements is acceptable for admission to candidacy.*

*Required: the general requirements as stated on pages 87-91. In addition to the thesis, the thirty hours of required work should include Physiology 201, 221 or 222, 231, 234, 235, 238, 240, and at least three credit hours of research (Physiology 235 or 236). Physiology 221-22 is required unless it was included in the undergraduate program.*

*Doctor of Philosophy (Graduate Council).—See page 97.*

### 115 *Physiology* (3)

Leese, Still, Toompas

*Lab. section A—Tues. and Thurs., 8:45 to 10:15 A.M.; section B—Tues. and Thurs., 5:15 to 6:25 P.M.*

*Lectures for premedical students covering the fundamentals of physiology in the various subdivisions. Prerequisite: one year of general science or the equivalent of a biological science.*

### 117 *Experimental Physiology* (1)

Toompas

*Lab.—Sat., 9:15 to 12:00 A.M.*

*Laboratory exercise in the fundamentals of physiology, the premedical method. Prerequisite or concurrent registration: Physiology 103 or the equivalent. Material fee, \$18.*



120 *Physiology of Endocrine Activity* (2)

Munan

Spring—Tues and Thurs, 6:12 P.M.

For nonmedical students. The circulatory, metabolic, reproductive, growth, and other adaptations, immediate and long term, accompanying and affecting endocrine activity. Prerequisite: Physiology 115 or the equivalent.

130 *The Psycho-physiology of Personality* (2)

Leese

Spring—Tues and Thurs, 5:12 P.M.

For nonmedical students. Lectures on the growth and expansion of personality, with emphasis on the physiological approach. Prerequisite: Physiology 115 or the equivalent and general psychology.

140-50 *Advanced Physiology*

Leese and Staff

Fall—4 hours a week; spring—14 hours a week.

Lectures and laboratory work in all divisions of Physiology. The course is designed for medical students.

201 *Experimental Method* (1)

Fall and spring—Sat., 6:00 A.M.

For nonmedical graduate students. Details of controlled experiments in medical or biological investigations; stress on design, relations, and judgment of accuracy and value of the statistical significance of experimental results.

211-12 *Problems in Physiology* (arr.)

The Staff

Academic year—as arranged.

For nonmedical graduate students. Open to undergraduate students with the approval of the Department. Prerequisite: Physiology 111 and 117, or the equivalent.

221-22 *Physiology Seminar* (1-1)

The Staff

Academic year—1 hour a week, as arranged.

For nonmedical students undertaking graduate work in physiology. Prerequisite: Physiology 115 and 117, or the equivalent.

231 *Advanced Physiology of Circulation and Respiration* (4)

Leese, Tocmpas, and Staff

Fall—4 hours a week, as arranged.

For nonmedical graduate students. Lectures on blood, heart, circulation, water, respiration, and acid-base balance.

- 234 *Advanced Physiology of Nutrition, Metabolism, Excretion* (2)      Leese, Still, Steinman, Hiebert  
 Spring—2 hours a week, as arranged.  
 For nonmedical graduate students. Lectures on nutrition, digestion, metabolism, excretion, and temperature regulation.
- 236 *Advanced Physiology of the Endocrine Glands and Reproduction* (1)      Baechus, Still  
 Spring—1 hour a week, as arranged.  
 For nonmedical graduate students. Lectures on digestion, foods, hormones, hormonal agents, and reproduction.
- 238 *Advanced Physiology of the Neuromuscular System* (2)      Leese, Toompas, Hiebert  
 Spring—2 hours a week, as arranged.  
 For nonmedical graduate students. Lectures on sensory reception, central nervous processes, somatic and visceral motor activity, and the behavior of smooth and striated muscle.
- 240 *Advanced Experimental Physiology* (3)      Toompas and Staff  
 Spring—3 hours a week, as arranged.  
 For nonmedical graduate students. Laboratory work only. Correlated with the courses in Physiology 231-238. Materials fee, \$42.
- 241 *Advanced Physiology of the Cell* (1)      Duryee  
 Fall—1 hour a week, as arranged.  
 For nonmedical graduate students. Special emphasis on biophysics and the biochemistry of the cell in relation to organ function.
- 295-96 *Research* (arr.)      Leese and Staff  
 Academic year—as arranged.
- 297-300 *Thesis* (3-3)      Leese

## POLITICAL SCIENCE

Warren Reed West, Ph.D., *Professor of Political Science*

John Withrow Brewer, Ph.D., *Professor of International Law, Executive Officer*

Wolfgang Herbert Kraus, Dr. Jur., S.J.D., *Professor of Political Science*

Fred Latimer Hadsel, Ph.D., *Professorial Lecturer in Political Science*

Floyd Millard Riddick, Ph.D., *Associate Professorial Lecturer in Political Science*

Howard Rowland Ludden, A.M., *Assistant Professor of Political Science*

Hugh Linus LeBlanc, A.M., *Assistant Professor of Political Science*

Robert Amendt Kinney, A.B., *Lecturer in Political Science*

William Spencer, A.M., *Lecturer in Political Science*

*Bachelor of Arts with a major in Political Science (Columbian College—Department of Political Science).—Prerequisite: The student must have completed in his first semester at least one course in Political Science.*

*Required, in addition to the general requirements stated on page 82-83, thirty semester hours from the following groups distributed as follows: Twenty hours from Group A and four from Group D; 11 hours from Groups A, D, or C.*

*Group A: Political Science 111, 112, 117-18, 119-21. Group B: Political Science 171, 172, 181-82. Group C: Political Science 134, 136, 137, 138, 139, 142, 143, 145, 146, 147-51, 147-48, 152, 177, 178, 187-88, 191, 192.*

*Undergraduate students interested in pursuing the graduate work in Political Science may consult the Executive Officer of the Department of Political Science for information of the above requirements.*

*Prerequisite for the study of Latin American Civilization (Columbian College—Field Study).—See the Department of History, page 118.*

*Master of Arts in the field of Political Science (Columbian College).—Prerequisite: A Bachelor of Arts degree with a major in Political Science or this University in the equivalent.*

*Required, in addition to the general requirements as stated on page 82-83. The thirty hours of required work must be obtained as follows by the student:*

*Master of Arts in the field of Latin American Civilization (Columbian College).—See the Department of History, page 118.*

*Doctor of Philosophy (Columbia University).—See page 127.*

*Prerequisite for the study of the field of Government in the field of Foreign Affairs and Public Affairs (School of Government).—See pages 142-43, 144-45.*

### FIRST GROUP

#### 1 *Introduction to Government*\* (3)

LeBlanc

*Fall—winter, spring—summer.*

*Basic principles and problems of political life: theories, forms, and processes of government in the United States and foreign countries. Attention is also given to international relations.*

\* See lists of the major Political Science courses for prerequisite to all subsequent courses.



9-10 *Government of the United States\** (3-3)

The Staff

*First half:* fall—morning and evening; spring—morning; summer 1957.  
*Second half:* fall—morning; spring—morning and evening; summer 1957.

*First half:* structure, powers, and operation of the Federal Government: Congress, the President, and the Supreme Court; elections, political parties, and pressure groups. *Second half:* state and local governments; civil rights; major functions of government at federal, state, and local levels.

## SECOND GROUP\*

104 *State and Local Governments* (3)

LeBlanc

1957-58 and alternate years, spring—morning.

State, municipal, and county local governments: forms, functions, and problems, with attention to policy, legislation, and administration, and to the limits of personal politics. Not open to students who have credit for *European History* course 115.

105 *The Governmental Process of the District of Columbia* (3)

LeBlanc

Summer 1957.

Legal structure and political problems of the District of Columbia including restrictions on home rule, Congressional relations, and group politics.

107 *Problems in Modern Political Thought* (3)

Kraus

Summer 1957.

Development of democratic political institutions and analysis of the main obstacles to constitutional democracy in the 19th and 20th centuries.

111 *Introduction to Comparative Government* (3)

Kraus

Fall—evening.

Government and politics of the principal constitutional democracies of Western Europe, with special attention to Great Britain and France.

112 *Introduction to Comparative Government* (3)

Kraus

Spring—evening.

Government and politics of the principal political systems of Central and Eastern Europe, Germany and the Soviet Union.

\* Excluded from the list of courses for students who have credit for *European History* course 115.



113 *Political Problems of the British Commonwealth of Nations* (3) Kraus

Summer 1957.

The transition of the Colonial Empire into the modern Commonwealth, questions of equal partnership, and governments and policies in the principal dominions.

117-18 *Political Theory: the Growth of Political Thought in the West* (3-3) Kraus

A lecture year—nothing.

First half: from Classical Antiquity to the Middle Ages. Second half: from the Renaissance and Reformation to recent times.

120 *Foundations of American Democracy* (3) Brewer

1958-59 and alternate years.

Introduction to political thought in the United States, from colonial times to the end of the Civil War period.

121-22 *The Constitution of the United States* (3-3) West

Academic year—morning; summer 1957—Political Science 121 (3).

Included: power of federal courts in constitutional interpretation. First half: emphasis on separation of powers, federal-state relationship, and taxation. Second half: emphasis on constitutional protection of civil rights.

125 *Legislative Organization* (3) Riddick

1957-58 and alternate years. Fall—evening.

A study of Congress: constitutional aspects, formal analysis of make-up, and political organization. Political and parliamentary procedures used in the preparation and enactment of legislation. Not open to students who have credit for former Political Science 124.

141 *The Development of Legal Institutions* (3) Brewer

1957-58 and alternate years. Fall—morning.

Introduction to historical jurisprudence, primary attention to the origins of the Roman Law of Continental Europe and of the Anglo-Saxon Common Law.

145 *Political Parties and Politics* (3) LeBlanc

Fall—morning.

Organization and operations of political parties in the United States: nature and source of party issues and candidate nominations and elections, influence on President and Congress. Not open to students who have credit for former Political Science 114.

146 *Political Pressures and Public Reactions* (3) Ludden

Spring—evening

Public opinion, special interest lobbies, and pressure groups as they operate on government to influence public policy.

151-52 *Public Administration* (3-3) LeBlanc

Academic year—evening; summer 1957—Political Science 151(3)

Introductory survey of the theory and practice of governmental administration and its relation to politics, legislation, the courts, and non-governmental organizations and interests.

157-58 *Current Problems in Domestic Politics* (1-1)

Academic year—evening

Analysis of outstanding contemporary issues in internal American politics with discussion of problems and policies.

162 *Administrative Law* (3) LeBlanc

1958-59 and alternate years.

Survey of relationship between administrative and judicial power with consideration of systems of management of power, allocation of power, and administrative power over private rights.

166 *Field Work in Government* (3)

Spring—on arranged

Practical training in the operation of the Federal Government, based on experience through assignment to selected government offices. Students will have an opportunity to observe and participate in government in the Washington area.

171 *International Politics* (3) Ludden

Fall—morning and evening; summer 1957

Topic covers analyzing the conduct of international relations and the operation of foreign policy: power politics, international relations, security, and international cooperation.

172 *International Organization, the United Nations* (3) Ludden

International relations and security course 1957

Development and current operation of international organization within the context of international peace, with attention to the United Nations.

177 *Recent Trends in Latin American Politics and Government* (3) Davis

Fall—evening; summer 1957.

Types of government, recent developments, and current political conditions in each of the twenty Latin American republics. May not be taken by students who have had Political Science 176 for credit.

178 *International Politics in the Western Hemisphere* (3) Davis

Spring—evening

Political relations of the American Republics in the 19th and 20th centuries, the development of Pan Americanism, and the Organization of American States. May not be taken by students who have had Political Science 175 for credit.

181-82 *International Law* (3-3) Brewer

Academic year—morning and evening, summer 1957—Political Science 181 (A)

Survey of the public law of nations with emphasis on the law of peace, Neutrality, and the wounded law of war receive attention in the second semester.

187-88 *Current Problems in International Politics* (1-1)

Academic year—evening

Analysis of outstanding contemporary international issues with discussion of problems and policies.

191 *Government and Politics in the Middle East* (3) Spencer

Fall—evening

International relations and governmental problems of the Arab world and adjacent areas.

194 *Far Eastern Politics: Contemporary International Relations in the Pacific Area* (3) Kinney

Spring—evening

Background and development of the major states of East Asia with attention to the international systems and the foreign policies of the major states.

197 *Proseminar in Foreign Affairs* (3) Kraus

Fall—evening, spring—morning

Reading and discussion course for coordination and review. Primarily for seniors in the Foreign Affairs major.



## THIRD GROUP

205-6 *The Federal Executive* (3-3)

Academic year—evening.

*First half.* Organization and election of the U. S. President; his constitutional and political powers; the cabinet and the Executive Office of the President; the position of the President in the executive and legislative branches of the government. *Second half.* The practical nature of the presidency; presidential policy making and control; the President as party head and as mediator of public opinion.

209-10 *Seminar: the Federal Government of the United States* (3-3) West

Academic year—evening.

A focused research emphasizing legislative problems of Congress and relations of Congress with the Administration.

212 *Seminar: Comparative Government* (3) Kraus

1958-59 and alternate years.

Selected topics and problems of comparative political and administrative institutions and the politics of modern constitutional governments and dictatorships.

213 *Readings in Comparative Government* (3) Kraus

1957-58 and alternate years: fall—evening.

Readings and group discussions on comparative political and administrative institutions with attention to legislatures, executive departments, political parties, etc.

217 *Seminar: Topics in Political Theory* (3) Kraus

1957-58 and alternate years: spring—evening.

Research and discussion on problems of modern political and constitutional theory, theoretical aspects of representative government, democracy, socialism, and totalitarianism.

222 *Reading Course in Political Theory* (3) Kraus

1958-59 and alternate years: Summer 1957.

Readings and group discussion, principally on modern political and constitutional theory since the 17th century.

271-72 *Problems in International Politics and Organization* (3-3) Hadsel*First half.* fall—evening. *Second half.*—not offered 1957-58.

A seminar to develop techniques of research in recent international



affairs and to examine developments in international politics and constitutions.

- 273 *Public Opinion and Foreign Policy* (3) Laddien  
Fall—evening.

Decision-making, organization, and operation of international institutions sponsored by major world powers. Public opinion in the United States influencing the formation and conduct of foreign policy.

- 274 *Methods and Objectives of Foreign Policy* (3) Hadsel  
Spring—evening.

Examination of the objectives of foreign policies of the major powers with attention to political, economic, and military methods used to pursue these objectives.

- 277 *Seminar: Latin American Government* (3) Davis  
Fall—evening.

Analysis of the political structure of selected Latin American republics. Two comparable governments studied each year.

- 278 *Seminar: Latin American Political Philosophy* (3) Davis  
Spring—evening.

Research in political personalities and philosophies of 19th and 20th century Latin America.

- 279 *Reading Course in International Affairs* (3) Hadsel  
1957-58 and alternate years; fall—morning; summer 1957.

Reading and discussion of basic materials designed to stimulate investigation of problems in the origin and development of international law, politics, and organization.

- 281-82 *Seminar: International Law and Relations* (3, 3) Brewster  
First half—summer 1957. Second half—spring—evening.

Research topics in the entire law of nations with special attention to problems of public settlement, economic war, neutrality, and state intervention, and to their political implications.

- 292 *International Politics and Government in the Middle East* (3) —————

Spring—evening.

Research and analysis of all international relations and major political problems of the Arab world and adjacent areas.

293-94 *Seminar: International Politics and Government* Kinney  
*in the Pacific Area (3-3)*

Academic year—evening.

Research and analysis of the major patterns of development in internal and international politics of the area, with advanced study of the governmental institutions of the Far East.

299-300 *Thesis (3-3)* The Staff

Academic year—as arranged; summer 1907

## PSYCHIATRY

Wintred Overholser, A.B., M.D., Sc.D., L.H.D., *Professor of Psychiatry,  
Executive Officer*

Addison McGuire Duval, M.D., *Clinical Professor of Psychiatry*

Leon Yochelson, A.B., M.D., *Clinical Professor of Psychiatry*

Henry Prather Laughlin, B.S., M.D., *Associate Clinical Professor of  
Psychiatry*

Marshall deGraffenried Ruffin, B.S., M.D., *Associate Clinical Professor  
of Psychiatry*

Joseph Eugene Rankin, B.S., M.D., *Assistant Professor of Psychiatry*

Sulney Berman, B.S., M.D., *Assistant Clinical Professor of Psychiatry*

Morris Kleinerman, Ch.D., M.B., *Assistant Clinical Professor of Psy-  
chiatry*

Jay Louis Hoffman, A.B., M.D., *Assistant Clinical Professor of Psy-  
chiatry*

Elmer Klein, B.S., M.D., *Assistant Clinical Professor of Psychiatry*

Anna Covne Todd, A.B., M.D., *Assistant Clinical Professor of Psy-  
chiatry*

Norman Taub, B.S., M.D., *Assistant Clinical Professor of Psychiatry*

Harold Corson, M.D., *Assistant Clinical Professor of Psychiatry*

Anna Genevieve McEldowney, A.B., M.D., *Associate in Psychiatry*

Sarah Shtoffer Tenenblatt, A.B., M.D., *Associate in Psychiatry*

David Eden, A.B., M.D., *Associate in Psychiatry*

Robert Milton Greenberg, A.B., M.D., *Associate in Psychiatry*

Helen Pallister, Ph.D., *Associate in Psychiatry (Psychology)*

Richard Allan Rogers, B.S., M.D., *Clinical Instructor in Psychiatry*

John Anthony Farrell, M.D., *Clinical Instructor in Psychiatry*

Wilmer Deaver Kehue, A.B., M.D., *Clinical Instructor in Psychiatry*

Herman Arnold Meversburg, B.S., M.D., *Clinical Instructor in Psy-  
chiatry*

Samuel Chrabolowski Gordon, M.D., *Clinical Instructor in Psychiatry*

Harold Bernard Lehrman, A.B., M.D., *Clinical Instructor in Psychiatry*

Randolph Adams Frank, A.B., M.D., *Clinical Instructor in Psychiatry*

Maxwell Boverman, A.B., M.D., *Clinical Instructor in Psychiatry*

Helen Glick Percy, A.B., M.S.W., *Clinical Instructor in Psychiatry  
(Social Work)*

### 105 *Dynamics of Personality Development*

Berman

Fall—1 hour a week

An orientation course in the personality, physiological, and psycho-  
logical growth and development of personality. Consideration of

characteristics of structure, function, and development of the psyche leading to normal behavior as a basis for the study of the pathological. Evaluation of interpersonal relationships.

178 *Psychopathology* Hoffman

Spring—1 hour a week.

Manifestations and understanding of various mental mechanisms and abnormal reaction-types, provided by history of development of psychopathology and illustrated with case material.

266 *Psychiatry* Overholser

Spring—1 hour a week

History, etiology, symptoms, course, and treatment of the major psychoses with emphasis on the dynamics involving the person as a whole.

268 *Demonstration Clinics* McEldowney, Tenenblatt

Spring—1 hour a week

Presentation of clinical cases of major mental illness and primary behavior disturbances correlating with Psychiatry 266. Each student examines patients under supervision. St. Elizabeth's and D. C. General Hospital.

272 *Psychosomatic Aspects of General Medicine* Ruffin

Spring—1 hour a week.

Somatic disorders of psychogenic origin. The role of personality reactions in functional and organic disorders.

324 *Psychoneurosis* Laughlin

Spring—1 hour a week

Etiology, psychopathology, clinical aspects, and treatment of various types of psychoneuroses. Medical Conference Room, D. C. General Hospital.

431-32 *Clinical Clerkship* The Staff

Three weeks divided service as arranged during academic year.

Supervised examination, diagnosis, and treatment of ambulatory inpatient cases in University Hospital and hospitalized units in St. Elizabeth's Hospital. Conferences for discussion of cases. Clinical application of psychiatric principles to general medical practice is stressed. University Hospital Inpatient and Outpatient Psychiatric Clinic and St. Elizabeth's Hospital.



## PSYCHOLOGY

\*Mitchell Dreese, Ph.D., *Professor of Educational Psychology*  
 Thelma Hunt, Ph.D., M.D., *Professor of Psychology, Executive Officer*  
 Henry Furness Hubbard, Ph.D., *Professorial Lecturer in Psychology*  
 Margaret Ives, Ph.D., *Professorial Lecturer in Psychology*  
 Curtis Edward Turkill, Ph.D., *Associate Professor of Psychology*  
 Don Carlos Faith, Ph.D., *Associate Professor of Educational Psychology*  
 Willard Edmund Caldwell, Ph.D., *Associate Professor of Psychology*  
 James Norman Mosel, A.M., *Associate Professor of Psychology*  
 Eva Mayne Johnson, A.M., *Assistant Professor of Psychology*  
 Clyde Joe Lindley, A.M., *Lecturer in Psychology*

*Bachelor of Arts with a major in Psychology* (Columbia College—Departmental)—Prerequisite: the Arts and Letters curriculum in the Junior College; see page 66 including Psychology 1 and 2, 24 or 26, Statistics 51.

The general requirements for the degree are stated on pages 80-81. The core required semester hours must include twenty-four hours in Psychology in addition to those taken as prerequisite including Psychology 58, 131, 151 or 171, 191, and 211, and Psychology 112 or Psychology 218.

*Master of Arts or Master of Science in the field of Psychology* (Columbia College)—Prerequisite: the degree of Bachelor of Arts with a major in Psychology at this University or the equivalent.

Required: the general requirements for the degree are stated on pages 87-91. Of the twenty-four required semester hours (exclusive of the thesis), a minimum of sixteen must be in third-grade courses or equivalent of twelve must be in psychology, including Psychology 201 and 202; twelve may be in social fields approved by the Department.

Master's programs are available in the following fields of concentration: (1) tests and measurements, (2) counseling and guidance, (3) child development, (4) social, (5) personnel, (6) experimental and (7) personality. For detailed requirements consult the Executive Officer of the Department.

*Doctor of Philosophy* (Graduate Council—See page 97)

*Bachelor of Arts in Government with a major in Business Administration* (Personal Management track) (School of Government)—See pages 152-53.

*Master of Arts in Personnel Administration or Master of Arts in Government with a specialty in Counseling, Psychotherapy or International Communication* (School of Government)—See pages 151-53, 154, 155.

*Master of Arts in Education in the field of Employee Training and Guidance* (School of Education)—Prerequisite: a bachelor's degree from an accredited institution and two years of successful teaching experience. The requirements for the degree are stated on pages 174-75.

### FIRST GROUP

#### 1 General Psychology I (3)

The Staff

Fall—morning and evening; spring—morning and evening; summer 1957

The fundamental principles underlying human behavior.

\* An hour of classes fall semester 1957-58.

† Psychology is a prerequisite of all other courses in Psychology.

- 4 *Psychology of Adjustment* (3) The Staff  
 Fall—morning and evening; spring—morning and evening; summer 1957.  
 Pupils involved in the total adjustment of the individual with emphasis on social environment; development in the individual of adjustment techniques.
- 22 *Introduction to Educational Psychology* (3) Faith, Lindley  
 Fall—evening; spring—morning; summer 1957.  
 Consideration of individual and group differences, adjustments, and the psychology of learning in relation to education and training.
- 29 *Child Psychology* (3) Johnson  
 Fall—evening; spring—morning; summer 1957.  
 A genetic approach to the study of the child. Special emphasis is placed on the socialization process, learning, and the child's view of the world.
- 98 *Abnormal Psychology* (3) Hunt, ————  
 Fall—morning; spring—morning and evening; summer 1957.  
 The causes, diagnosis, treatment, and prevention of the various types of maladjustments and mental disorders. Prerequisite: 6 credits in psychology, or 3 credits in psychology and 6 credits in a biological science.

## SECOND GROUP\*

- 112 *Adolescent Psychology* (3) Johnson  
 Fall—morning.  
 Psychological characteristics and problems peculiar to adolescence, with emphasis on acquisition of procedures to solution of such problems.
- 118 *Physiological Psychology* (3) Hunt  
 Spring—evening.  
 Structure, function, and physiology of receptors, sensory systems, and effectors as mediators of behavior, including drives, learning, and emotion.
- 121 *Educational Psychology* (3) Faith  
 Fall—on alternate; spring—on alternate.  
 Advanced course in educational psychology. Admission by permission of the instructor.

\* Six credits in this group must be obtained by all second-group students.

- 129 *Introduction to Counseling and Guidance* (3) —————  
 Fall—evening  
 A survey of the basic principles, techniques, and procedures as applied to vocational, educational, and personal counseling.
- 131 *Psychological Tests* (3) Hunt  
 Fall—morning; spring—evening; summer 1957  
 A survey of psychological tests and their more common uses in business, industry, government, law, medicine, and education. Material fee, \$7.
- 141 *Leadership, Group Behavior, and Student Life* (3) Faith  
 Fall—morning  
 A survey of the foundations of leadership, of the factors which underlie effective participation in group activities, and of the interrelations between the student and his university.
- 144 *Personnel Psychology* (3) Hubbard, Mosel  
 Fall—evening; spring—evening; summer 1957  
 The applications of psychology to personnel work in education, business, industry, and government.
- 146 *Problems in Human Relations* (3) Mosel  
 Fall—morning; spring—evening  
 The application of psychological principles to understanding and improving personal and group relations. Emphasis will be given to studies and specific problems drawn from life situations with important attention to consistency and administrative relationships. Prerequisite: Psychology 1 (or Psychology 145 for students in the special treatment).
- 148 *Psychology of Advertising and Market Research* (3) Mosel  
 1957-58 and alternate years: fall—evening  
 The motivational and social dynamics of consumer behavior. Evaluation of the psychology of effectiveness of consumer media and advertising and public relation programs. Comparison of current techniques and theories in consumer research.
- 151 *Social Psychology* (3) Turiell  
 Fall—morning; spring—evening; summer 1957  
 The social foundations of perception and behavior. Individual adjustment to group situations, such as the family, school, community, and



occupation. The psychological basis of race prejudice, nationalism, and war.

- 156 *Psychology of Propaganda and Public Opinion* (3) Tuthill

Spring—evening; summer 1957

The psychology of opinion formation, the measurement of opinion, the social determinants of attitude, the psychological process in propaganda, the bases of receptivity to propaganda, psychological warfare.

- 161 *Comparative Psychology* (3) Caldwell

Fall—as arranged.

A survey of psychological processes in bird-behavior, cognition, with special emphasis on the evolution of animal behavior from the lower forms to man. Accompanied by laboratory work. Material fee, \$10.

- 171 *Psychology of Personality* (3) Caldwell

Spring—morning.

Contemporary approaches to the study of personality. Prerequisite: 12 credits in psychology, including Animal Psychology.

- 191 *Experimental Psychology* (3) Tuthill, ———

Fall—evening; spring—evening

The application of experimental methods to various psychological problems. Prerequisite: 12 credits in psychology and an elementary course in statistics. Material fee, \$10.

- 192 *Problems in Experimental Psychology* (3) Tuthill, Caldwell

Fall—as arranged; spring—as arranged.

Opportunity for work on individual experimental projects. Prerequisite: Psychology 161 or 191 and permission of the instructor.

- 193-94 *Readings in Psychology* (3-3) The Staff

Academic year—as arranged; summer 1957—Psychology 193 (3)

Supervised reading on special topics in psychology, with emphasis on independent studies. Open only to students with 12 or more credits in psychology with a cumulative average of 3.00 or higher. Special permission of staff members under whose course it is to be taken is necessary.

- 196 *History and Systems of Psychology* (3) Caldwell

Fall—evening.

A survey of the contemporary schools of psychology. Prerequisite: 12 credits in psychology.



## THIRD GROUP\*

- 201 *Seminar: Advanced General Psychology* (3) Tuthill  
Fall—afternoon; spring—evening  
General review of the field for graduate students with an intensive study of selected problems. Required in all graduate programs.
- 202 *Psychological Research: Methods and Procedures* (3) —————  
Fall—evening; spring—afternoon  
Required of all Master of Arts candidates in psychology. Prerequisites: Experimental Psychology and statistics.
- 203-6 *Field Work in Psychology* (1-3) The Staff  
Academic year—as arranged; summer 1957—Psychology 205 (1)  
Supervised field work in agencies providing psychological service. Admission by permission of the Executive Officer of the Department.
- 207-8 *Readings in Psychology for Graduate Students* (3-3) The Staff  
Academic year—as arranged; summer 1957—Psychology 207 (3)  
Supervised readings with conferences on selected topics in psychology. Open only to students who have had course work in the field of the readings.
- 209 *Seminar: Psychology of Motivation* (3) Caldwell  
Spring—evening  
A consideration of various theoretical approaches to the psychology of motivation and systematic concepts and experimental findings deriving from each approach.
- 212 *Seminar: Personality Evaluation by Projection Techniques* (3) Ives  
1958-59 and alternate years  
1978-79 and alternate years
- 213 *Seminar: Clinical Psychology* (3) Ives  
Spring—evening  
A study of the clinical applications of non-projective tests.
- 215 *Seminar: Advanced Study of Projective Techniques* (3) Ives  
Fall—evening  
Primary emphasis upon the Rorschach Test. Prerequisite: Psychology 212.

\* Open only to graduate students with an or more credits in psychology, except by special permission of instructors and Executive Officer of the Department.

- 220 *Seminar: Abnormal Psychology* (3) \_\_\_\_\_  
 Fall—evening.  
 An intensive study of selected problems in the field of abnormal psychology.
- 221 *Seminar: Psychology of the Handicapped: Dynamics of Adjustment* (3) \_\_\_\_\_  
 Spring—afternoon.  
 The dynamics of adjustment and criteria of adjustment in general; the specific problems of adjustment in the handicapped.
- 222 *Seminar: Rehabilitation Counseling: Orientation and Survey of Field* (3) \_\_\_\_\_  
 Fall—evening.  
 Aims, function, and nature of the rehabilitation process; the special problems of counseling the handicapped.
- 223 *Seminar: Learning* (3) \_\_\_\_\_  
 Fall—evening.  
 Covers theories of learning.
- 224 *Seminar: Medical Backgrounds for Rehabilitation Counseling* (3) \_\_\_\_\_  
 Fall—evening.  
 An elementary medical survey of the etiology, therapy, and prognosis of various disabling conditions and disorders. Somatic and psychogenic problems in handicaps.
- 225 *Seminar: Mental Hygiene* (3) Caldwell  
 Fall—evening; summer 1957.  
 A study of mental health problems with special attention to programs of prevention.
- 226 *Seminar: Clinical Psychology of Childhood* (3) Johnson  
 Spring—evening.  
 A survey of children's behavior and personality disorders.
- 227 *Seminar: Counseling and Guidance* (3) Dreese  
 Spring—evening; summer 1957.  
 Recent developments and current problems in vocational, educational, and personal guidance in various types of agencies with particular reference to education. Prerequisite: educational or psychological measurements and Psychology 129 or the equivalent.

228 *Seminar: Techniques of Counseling* (3)

Dreese

Spring—evening

See the types of vocational, educational, and personal counseling problems approached through the case method. Prerequisite: recent previous course in counseling and guidance and familiarity with individual analysis methods.

229 *Seminar: Occupational and Educational Information* (3)

Faith

Spring—evening

Designed to acquaint vocational and educational counselors with the basic occupational and educational information necessary in counseling. Sources of data and techniques of collecting, analyzing, and disseminating for purposes of guidance.

231 *Test Construction* (3)

Hunt

Fall—evening

The principles underlying test construction; statistical techniques in the construction, evaluation, and interpretation of psychological, educational, and vocational tests. Prerequisite: a course in tests and measurements and a course in statistics.

232 *Research: Test Construction* (3)

Hunt

Fall—as arranged; spring—as arranged

Individual projects in construction and evaluation of psychological, educational, or vocational tests. Prerequisite: Psychology 231 and permission of the instructor.

233 *Individual Psychological Testing* (3)

Johnson

Fall—afternoon; spring—afternoon

Instruction and practice in giving of the Rort Test and the Wechsler Bellevue Test. Prerequisite: an elementary course in tests and measurements. Material fee, \$7.

234 *Seminar: Test Theory* (3)

Mosci

1958-59 and alternate years

236 *Seminar: Analysis of the Individual for Purposes of Counseling* (3)

Faith

Fall—evening

A detailed study of individual analysis techniques with practice in handling such methods. Prerequisite: an introductory course in educational or psychological measurements.



- 244 *Seminar: Job Analysis and Evaluation* (3) Mosé  
Summer 1957.
- 245 *Seminar: Employee Motivation and Morale* (3) Mosé  
Spring—evening.  
Application of the principles of primary group functioning and group-centered administration to the problem of motivating employees, building morale and strengthening human relations. Emphasis is upon use of group dynamics in supervision and leadership.
- 246 *Seminar: Personnel Measurement Techniques* (3) Mosé  
Fall—evening.  
Detailed consideration of interviews, personal data analysis, tests, ratings, and questionnaires in evaluating employability, job performance, and worker morale.
- 249 *Seminar: Human Engineering* (3) ———  
Fall—evening.  
Application of findings and methods of experimental psychology to design and operation of equipment and man-machine systems. Relation of capacities of the operator to information display systems, control mechanisms, work environment, and work methods.
- 251 *Seminar: Advanced Social Psychology* (3) Tuthill  
Fall—evening.  
Current research and theory in social psychology: group dynamics, ego-involvements, action research, and social interaction theory.
- 254 *Seminar: Group Dynamics* (3) Tuthill  
1957-58 and alternate years—spring—evening.  
The experimental study of small groups, autocratic and non- group climates, interaction process analysis, Lewin's field theory, approach to individual and group processes.
- 255 *Seminar: Techniques of Opinion and Attitude Measurement* (3) Tuthill  
1958-59 and alternate years.  
Methods of attitude measurement (interviews, questionnaires, scales, polls) as currently used by private and governmental organizations. The place of attitude studies in schools, industry, government, etc.



- 201 *Seminar: International Communication* (3) Mosé  
1957-58 and alternate years, spring—evening.  
Techniques and principles of tactical and strategic psychological operations; psychological and etiological foundations of international behavior and communication; the psychological effects of physical weapon systems.
- 272 *Seminar: Theories of Personality* (3) Caldwell  
Fall—evening.  
A survey of the various theories of personality, with emphasis upon theoretical problems and methodology in the field of personality study.
- 295-96 *Research in Psychology* (arr.) The Staff  
Academic year—as arranged, summer 1957—Psychology 295 (arr.).  
Individual research by student, carried out under supervision of staff member.
- 299-300 *Thesis* (3-3) The Staff  
Academic year—as arranged, summer 1957—Psychology 299 (3).

## COURSE OFFERED IN SPECIAL PROGRAM

In addition to the regular courses announced above the University offers the following course, which is available only to students enrolled in the Engineering Administration program.

- 145 *Principles of Human Relations* (3)

## RADIOLOGY

William Woodrow Stanbro, M.D., *Professor of Radiology, Executive Officer*

Charlotte Patricia Donlan, A.B., M.D., *Associate Clinical Professor of Radiology*

Solomon Rodney Bersack, B.S., M.D., *Assistant Clinical Professor of Radiology*

Harry Jay Kieherer, M.D., *Assistant Clinical Professor of Radiology*

Alvin Charles Wyman, A.B., M.D., *Associate in Radiology*

Herman Litwer, M.D., *Associate in Radiology*

George Tievsky, M.D., *Clinical Instructor in Radiology*

Urbai Vincent Wilcox II, M.D., *Clinical Instructor in Radiology*

Nan Poppel Van Wagenen, B.S., M.D., *Clinical Instructor in Radiology*

Charles Malcolm Weber, M.D., *Clinical Instructor in Radiology*

### 115-16 *Anatomy*

The Staff

Academic year—as arranged

Correlation of gross and Roentgen anatomy

### 220 *Principles of Radiology*

The Staff

Spring—1 hour a week

Lectures and discussions

### 313 *Advanced Radiological Diagnosis*

The Staff

Fall—as arranged

Lectures and discussions

### 421-22 *Clinical Studies*

The Staff

Students are assigned to the X-ray Department in rotation on a full-time basis for a specific period.

## RELIGION

Joseph Richard Sizoo, A.M., S.T.D., D.D., Litt.D., *Milbank Professor of Religion*

Clifton Earl Olmstead, A.B., Th.D., *Associate Professor of Religion, Executive Officer*

Charles Duell Kean, A.B., S.T.B., D.D., *Lecturer in Religion*

David Hirsh Panitz, A.M., Rabbi, *Lecturer in Religion*

Murray Lee Newman, Jr., A.M., B.D., *Lecturer in Religion*

*Bachelor of Arts with a major in Religion (Columbia College—Departmental)*—Prerequisite: the Arts and Letters curriculum in the Junior College, see page 66, including Religion 9, 10, and 57-60. Required: the general requirements as stated on pages 8-86, including a minimum of eighteen semester hours in religion beyond first group courses.

*Master of Arts in the field of Religion (Columbia College)*—Prerequisite: an undergraduate major in Religion at the University or the equivalent.

Required: the general requirements as stated on pages 87-91. Of the twenty-four semester hours of required courses (exclusive of the thesis), at least two must be in third group religion courses; a maximum of two may be in a closely related field outside the Department of Religion as approved by the Department.

*Master of Arts in the field of Religious Education (Columbia College)*—Prerequisite: an undergraduate major in Religion at the University or the equivalent, the following specific courses or the equivalent: Education 109-110; Psychology 1, 22, and 23; Sociology 1, 2, 3, 10, 11.

Required: the general requirements as stated on pages 87-91. Of the twenty-four semester hours of required courses (exclusive of the thesis), at least six must be in third group religion courses; a maximum of twelve may be in a closely related field outside the Department of Religion as approved by the Department.

### FIRST GROUP

#### 9 *The Old Testament* (3)

SIZOO

Fall—morning

A historical and literary approach to the study of the books of the Old Testament with special consideration given to the development of religious ideas, institutions, and outstanding personalities.

#### 10 *The New Testament* (3)

SIZOO

Spring—morning

A study of the literature of the New Testament from the standpoint of creation, purpose, dominant ideas, and permanent values. Special emphasis on the approach, the structure, and the significance of the Gospels and Epistles.

59-60 *History of Religion* (3-3)

Olmstead

Academic year—morning and evening; summer 1957—Religion 59 (3)

*First half:* primitive and ancient national religions; Confucianism, Taoism, Buddhism, Hinduism, and Shintoism—their historical settings, founders, and development of religious thought and culture. *Second half:* Judaism, Christianity, and Islam—analysis of their origin, evolution, and contemporary status.

## SECOND GROUP

103 *The Prophets, Their Times and Their Message* (3)

Panitz

Fall—evening.

The development of prophecy in the Old Testament, cultural, economic, psychological, and religious factors in the movement, elements of lasting value in the prophetic tradition. A few of the prophets will be selected for particular study.

104 *The Life and Thought of Jesus* (3)

Kean

Spring—evening.

A comprehensive study of the life and teachings of Jesus as they relate to problems of belief, standards of value, and questions of sin; the significance of the message of Jesus for our own times.

121 *Problems of Western Religious Thought* (3)

Olmstead

Not offered 1957-58

The nature of religious truth and experience; the existence, character, and activity of God; the problem of modern man; the problem of evil and suffering; eternal life; science and religion; the meaning of worship; religious views of history.

122 *Christian Ethics and Modern Society* (3)

Olmstead

Not offered 1957-58

The nature and principles of the Christian life as developed by the Christian community; problems of personal conduct; the application of the Christian standard to family, trade, and economic institutions.

131 *History of Christianity to the Reformation* (3)

Olmstead

Fall—morning.

The rise and expansion of Christianity; the development of Christian thought; the evolution of church organization and worship; the Reformation and pre-Reformation dissent.



132 *History of Christianity since the Reformation* (3) Olmstead

Spring—morning.

The origin and development of Protestantism, the Roman Catholic revival, the status of the Eastern churches, doctrine, worship, expansion, church and state, and relation to modern thought and life.

141-42 *Religious Education* (3-3)

Not offered 1957-58.

Principles and practice of religious education in the home, church, and community; basic educational procedures and special techniques; organization and administration of religious education.

172 *Religion in American Culture* (3)

Olmstead

Spring—morning, summer 1957.

Growth of religious beliefs and institutions in American culture; the history of religious freedom and diversity; religion and literature, revelation and education; ethics and religious thought; divisions and prospective movements in religion.

THIRD GROUP

209-11 *Seminar in Biblical Literature* (3-3)

Newman

Academic year—evening

The development of religious concepts in the Jewish-Christian tradition.

231-32 *Seminar in the History of Christian Thought* (3-3) Olmstead

Not offered 1957-58.

An advanced study of the development of Christian thought from primitive beginnings to the present.

241-42 *Seminar in Religious Education* (3-3)

Academic year—evening

Advanced course dealing with some of the major problems in the practice of religious education.

299-300 *Theta* (3-3)

The Staff

Academic year—on alternate

## ROMANCE LANGUAGES AND LITERATURES

Henry Grattan Doyle, A.M., LL.D., Litt.D., *Professor Emeritus of Romance Languages in Residence*

Metle Irving Protzman, Ph.D., *Professor of Romance Languages*

Alan Thomas Deibert, A.M., *Professor of Romance Languages*

Antonio Alonso, A.M., *Associate Professor of Spanish*

Rafael Supervia, Doctor en Derecho, *Associate Professor of Spanish*

James Willis Robb, A.M., *Assistant Professor of Romance Languages*

William Graham Clubb, Ph.D., *Assistant Professor of French*

Joseph Louis Merivier, Jr., A.M., *Assistant Professor of Romance Languages*

Guido Ettore Mazzeo, A.M., *Lecturer in Romance Languages*

*Bachelor of Arts with majors in (1) French Literature, (2) Spanish American Literature, and (3) Spanish Literature (Columbian College)—Prerequisite: the Arts and Letters curriculum in the Junior College.*

Required: the general requirements as stated on pages 83-86 and the grade "pass" on the major examination at the end of the senior year. The designated field of knowledge upon which the student will be examined includes the political, social, and cultural backgrounds of the literature studied; the writers, and their works. A reasonable proficiency in the spoken language is required. Majors in Romance Languages are strongly advised to study Latin, a knowledge of which is required for graduate work in most institutions. The Department of Romance Languages provides a program in each of the major fields intended to assist the student in his preparation for the major examination.

*Master of Arts: (1) French Literature, (2) Spanish American Literature, and (3) Spanish Literature (Columbian College)—Prerequisite: the degree of Bachelor of Arts in the appropriate field from the University or the equivalent.*

Required: the general requirements as stated on pages 87-91. The thirty hours of required work must include a thesis, for which six hours of credit are allotted. The remainder of the program is arranged in consultation with the student's major adviser.

*Doctor of Philosophy (Graduate Council)—See page 97.*

*Bachelor of Arts in Education with teaching fields in French and in Spanish (School of Education)—Prerequisite: the Education curriculum, page 68.*

Required: the French option, page 105, or the Spanish option, page 108, the professional courses listed on pages 102-7.

### FRENCH

#### FIRST GROUP

##### 1-2 First-year French (3-3)

The Staff

A year course credit is not given for the first half until the second half is completed.

First Half: All morning and evening spring—morning and evening.

summer 1957. *Second half:* fall—morning; spring—morning and evening; summer 1957.

For beginners. Grammar, composition, drill in pronunciation, translation of modern French prose.

3-4 *Second-year French*\* (3-3)

The Staff

A year course; credit is not given for the first half until the second half is completed.

*First half:* fall—morning and evening; spring—morning; summer 1957.

*Second half:* fall—morning; spring—morning and evening; summer 1957.

Advanced grammar and composition, reading of modern French prose, oral practice, drill in pronunciation. Prerequisite: French 1-2 or two years of high school French.

9-10 *French Conversation and Composition* (3-3)

The Staff

Academic year—morning and evening; summer 1957.

49 *French Readings for Non-major Students* (3)

Clubb

Fall—evening; spring—evening.

Primarily for graduate students preparing for reading examinations. Undergraduates admitted with permission of the instructor. No academic credit for graduate students.

51-52 *Survey of French Literature and Civilization*\* (3-3)

Deibert

Academic year—evening.

The social, artistic, and cultural background of French civilization. Lectures, recitations, and informal discussions.

SECOND GROUP\*

119-20 *French Literature of the Sixteenth Century* (3-3)

1957-58 and alternate years; academic year—morning.

Prose, poetry, drama, and memory of the French Renaissance: Rabelais, Montaigne, Molière, La Fontaine. Class analysis of texts, collateral reading. Recommended: History 12.

121-22 *French Literature of the Seventeenth Century* (3-3)

Protzman

1958-59 and alternate years.

History, philosophy, literature, science, letters, composition, drama, fiction, poetry. Class analysis of texts, collateral reading.

\* French 1-4 is required and French 51-52 is recommended as prerequisite for all second group courses.



- 123-24 *French Literature of the Eighteenth Century* Deibert  
(3-3)  
1957-58 and alternate years: academic year—evening.  
History, philosophy, criticism, letters, drama, fiction, poetry, the "salons", the idea of progress, the idea of science. Class analysis of texts, collateral reading, lectures on literature and history.
- 125-26 *French Literature of the Nineteenth Century*  
(3-3)  
1958-59 and alternate years  
Romanticism and realism, fiction, poetry, drama, criticism. Class analysis of texts, collateral reading, lectures on literature and history.
- 127-28 *French Literature of the Twentieth Century* ———  
(3-3)  
1957-58 and alternate years: academic year—evening.  
Fiction, poetry, drama, criticism. Class analysis of texts, collateral reading, lectures on literature and history.
- 199-200 *Proseminar: Readings for the Major in French Literature* (3-3) Clabb  
Academic year—as arranged.  
Conferences and group discussion.

## THIRD GROUP

- 227-28 *Seminar in Modern French Literature* (3-3)  
1958-59 and alternate years.  
Prerequisite: a second-group course in French literature.
- 229-30 *Seminar in Classical French Literature* (3-3) Protzman  
1957-58 and alternate years: academic year—as arranged.  
Prerequisite: a second-group course in French literature.
- 249-50 *Old French*\* (3-3) Doyle  
A year course, credit is not given for the first half until the second half is completed.  
Academic year—as arranged.  
Phonology and morphology of Old French, with an outline of its development through Voltaire's time, survey of French literature to the end of the 14th century. Prerequisite: a second-group course in French literature, or the course knowledge of Latin.

\* Only one of the following courses: French 247-50, French 251-52, and Spanish 249-50 will be given in 1957-58, depending on demand.



251-52 *Middle French*\* (3-3)

Doyle

A year course; credit is not given for the first half until the second half is completed.

Academic year—as arranged.

French literature of the 14th and 15th centuries. Class analysis of texts, collateral reading. Prerequisite: a second group course in French literature. Knowledge of Old French is desirable.

299-300 *Thesis* (3-3)

The Staff

Academic year—as arranged.

PORTUGUESE

FIRST GROUP

1-2 *First-year Portuguese* (3-3)

A year course; credit is not given for the first half until the second half is completed.

Not offered 1957-58.

For beginners. Grammar, composition, drill in pronunciation, translation of modern Portuguese prose.

3-4 *Second-year Portuguese* (3-3)

A year course; credit is not given for the first half until the second half is completed.

Not offered 1957-58.

Advanced grammar and composition, reading of modern Portuguese prose, oral practice, introduction to Portuguese and Brazilian civilization. Prerequisite: Portuguese 1-2 or the equivalent.

SECOND GROUP

127-28 *Portuguese and Brazilian Literature* (2-2)

Not offered 1957-58.

Evolution of the Portuguese language, outline of the literature of Portugal (fall semester) and Brazil (spring semester). Lectures, readings, written reports. Conducted in Portuguese. Prerequisite: Portuguese 3-4 or the equivalent.

SPANISH

FIRST GROUP

1-2 *First-year Spanish* (2-3)

The Staff

A year course; credit is not given for the first half until the second half is completed.

First half, fall—morning and evening, spring—morning and evening.

\* Only one of the following courses, French 249-50, French 251-52, and Spanish 249-50 will be given in 1957-58, depending on demand.

summer 1957. *Second half*: fall—morning; spring—morning and evening; summer 1957.

For beginners. Grammar, composition, drill in pronunciation, translation of modern Spanish prose.

3-4 *Second-year Spanish\** (3-3) The Staff

A year course; credit is not given for the first half until the second half is completed.

*First half*: fall—morning and evening; spring—morning; summer 1957. *Second half*: fall—morning; spring—morning and evening; summer 1957.

Advanced grammar and composition, reading of modern Spanish prose, oral practice, introduction to Hispanic civilization. Prerequisite: Spanish 1-2 or two years of high school Spanish.

7-10 *Spanish Conversation and Composition* Alonso and Staff  
(3-3)

Academic year—morning and evening; summer 1957.

11 *Spanish Readings for Non-major Students* (3) Mazzeo, Robb

Fall—evening; spring—evening.

Primarily for graduate students preparing for reading examinations. Undergraduates admitted with permission of the instructor. No academic credit for graduate students.

51-52 *Survey of Spanish Literature and Civilization\** (3-3) Supervia

Academic year—evening.

The social, artistic, and cultural background of Spanish civilization. Lectures, recitations, and informal discussion.

### SECOND GROUP\*

121-22 *Spanish Literature of the Golden Age* (3-3) Alonso  
1958-59 and alternate years.

Lope de Vega, Calderón, the classic drama, the ballad, lyric poetry. Close analysis of texts: unilateral reading, lectures on literature and history.

123-24 *Cervantes: the Prince of the Golden Age* (3-3) Alonso

1957-58 and alternate years. Academic year—evening.

Life and works of Cervantes. The Quixote, the Novelas Exemplares, and other works.

\* Spanish 1-4 is required and Spanish 51-52 is recommended as prerequisite to all second group courses in Spanish.

- 125-26 *Modern Spanish Literature* (3-3) Alonso  
1958-59 and alternate years.  
Prose and poetry of the 18th and 19th centuries. Class analysis of texts, collateral readings, lectures on literature and history.
- 127-28 *Contemporary Spanish Literature* (3-3) Supervia  
1957-58 and alternate years; academic year—evening.  
Prose and poetry of the latter part of the 19th and 20th centuries. Class analysis of texts, collateral reading, lectures on literature and history.
- 151-52 *The Spanish American Novel* (3-3)  
Not offered 1957-58.  
Development of the novel in Spanish America. Lectures, collateral reading, and class analysis of texts.
- 155-56 *Spanish American Literature to 1880* (3-3) Robb  
1957-58 and alternate years; academic year—evening.  
The literature of Spanish America from the colonial period to the latter part of the 19th century. Lectures, collateral reading, reports, and class analysis of important works.
- 157-58 *Spanish American Literature Since 1880*  
(3-3)  
1958-59 and alternate years.  
The literature of Spanish America from 1880 to the contemporary period. Lectures, collateral reading, reports, and class analysis of important works.
- 197-98 *Proseminar: Readings for the Master in Spanish American Literature* (3-3) Robb  
Academic year—as arranged.  
Conferences and group discussions.
- 199-200 *Proseminar: Readings for the Master in Spanish Literature* (3-3) Alonso  
Academic year—as arranged.  
Conferences and group discussions.

## THIRD GROUP

- 225-26 *Seminar in Spanish Literature* (3-3) Alonso  
1957-58 and alternate years; academic year—as arranged.  
Prerequisite: a second group course in Spanish literature.

227-28 *Seminar in Spanish American Literature* (3-3)

Not offered 1957-58

Prerequisite: a second-group course in Spanish American literature

249-50 *Old Spanish*\* (3-3)

Doyle

A year course; credit is not given for the first half until the second half is completed.

Academic year—48 Arranged

Literature and culture: *Poema del Cid*, *Libro de Buen Amor*, *Comedia Luterana*, etc.; Menéndez Pidal's *Manual de gramática histórica española* and Lind's *Old Spanish Readings*. Prerequisite: a second-group course in Spanish literature; an elementary knowledge of Latin.299-300 *Thesis* (3-3)

The Staff

Academic year—48 Arranged

\* Only one of the following courses, French 249-50, French 299-300, and Spanish 249-50, will be given in 1957-58, depending on demand.



## SECRETARIAL STUDIES

Mildred Hollander Shott, A.M., *Associate Professor of Secretarial Studies, Executive Officer*

William Hughes Westbrook, A.B., *Associate in Secretarial Studies*

Leona Fehler Dorsey, A.M., *Associate in Secretarial Studies*

Wilma Bidwell, A.M., *Associate in Secretarial Studies*

*Associate in Arts (Home College)—the best practical instruction in Secretarial Studies*—For curriculum, see page 73.

*Backbone of Arts in Education with a specialty field in Business Education (School of Education)*—Prerequisite: the Education curriculum, page 68.

Removal: the Secretarial Studies course, page 114 and the professional courses listed on pages 115-7.

### FIRST GROUP

- 1 *Elementary Typewriting* (3) Shott, Westbrook  
Fall—morning and evening, spring—evening; summer 1957.  
Fundamental techniques of typewriting, basic styles of business letters, introduction to tabulation, and preparation of general office forms. Laboratory fee, \$7.
- 2 *Intermediate Typewriting* (3) Shott, Westbrook  
Fall—evening, spring—morning and evening; summer 1957.  
The business letter and its attachments, advanced tabulation, manuscript typewriting, stencil cutting, and legal documents. Prerequisite: Secretarial Studies 1 or the equivalent ability to type accurately at 30 words a minute. Laboratory fee, \$7.
- 11 *Elementary Shorthand and Transcription* (3) Shott and Staff  
Fall—morning and evening, spring—evening; summer 1957.  
A study of the principles of Gregg shorthand correlated with dictation and transcription. Maximum dictation speed of 60 words a minute attained. Laboratory fee, \$1.
- 12 *Intermediate Shorthand and Transcription* (3) Shott and Staff  
Fall—evening; spring—morning and evening.  
Review of the principles of Gregg shorthand. Dictation and transcription on general and specialized business subjects. Maximum dictation

speed of 80 words a minute attained. Prerequisite: Secretarial Studies 11 or the equivalent; ability to take dictation at 60 words a minute. Laboratory fee, \$5.

15 *Advanced Shorthand, Typewriting, and Transcription* (3) Shott and Staff

Fall—morning and evening.

Dictation and transcription involving vocabularies in specific businesses. Minimum speed of 100 words a minute attained in dictation. Prerequisite: Secretarial Studies 12 or the equivalent. Laboratory fee, \$5.

16 *Secretarial Shorthand, Typewriting, and Transcription* (3) Shott and Staff

Spring—morning and evening.

Dictation and transcription involving vocabularies used in the legal and medical professions. Minimum dictation speed of 120 words a minute attained. Prerequisite: Secretarial Studies 15 or the equivalent. Laboratory fee, \$5.

51 *Business Correspondence* (3) Shott

1957-58 and alternate years: fall—evening; 1958-59 and alternate years: fall—morning.

Development of the technique of effective communication with reference to business letters and forms. Survey and analysis of current business literature.

54 *Secretarial Practice* (3) Shott and Staff

1957-58 and alternate years: spring—morning and evening; 1958-59 and alternate years: spring—morning.

A thorough study of secretarial problems and procedures. Practice in the use of secretarial equipment and supplies. The study of secretarial personality and office relationships.

## SLAVIC LANGUAGES AND LITERATURES

Helen Zhemchuzhnaya Yakobson, B.S., *Assistant Professor of Russian,  
Executive Officer*  
Peter Zouboff, Ph.D., *Lecturer in Russian*

### 1-2 *First-year Russian* (3-3) Yakobson and Staff

*First half:* fall—morning and evening; spring—evening; summer 1957.  
*Second half:* fall—evening; spring—morning and evening; summer 1957.

A beginner's course in the elements of grammar and pronunciation with graded reading, oral drill, and written practice.

### 3-4 *Second-year Russian* (3-3) Yakobson and Staff

*First half:* fall—morning and evening. *Second half:* fall—evening; spring—morning and evening.

Systematic review of grammar. Study of special problems of Russian morphology and syntax. Oral and written reports on assigned topics.

### 9-10 *Russian Conversation* (3-3) Yakobson and Staff

Academic year—evening

### 101-2 *Rapid Readings in Russian* (3-3) Yakobson

1957-58 and alternate years; a 1-hour, 1-year—evening

Readings and translations of classic and modern literary texts and periodical literature.

### 103-4 *Scientific Russian* (3-3) Yakobson

1958-59 and alternate years.

Reading and translation of technical texts.

## SOCIOLOGY\*

Harold Loran Geisert, Ph.D., *Professor of Sociology, Executive Officer*  
 Henry Davidson Sheldon, Ph.D., *Professorial Lecturer in Sociology*  
 Carr Bartleson Lavell, A.M., *Associate Professor of Sociology*  
 Richard Walton Stephens, Ph.D., *Assistant Professor of Sociology*

*Bachelor of Arts with a major in Sociology (Columbian College).—Departmental.*  
*1957*—Prerequisite: the Arts and Letters curriculum in the Junior College, see  
 page 64, including Sociology 1-2.

Required: the general requirements as stated on pages 84-86, including Sociology  
 172 and 181 and eighteen hours in second- or third-group courses in Sociology.

*Master of Arts in the field of Sociology (Columbian College).—Prerequisite:*  
 the degree of Bachelor of Arts with a major in Sociology in this University, or  
 the equivalent.

Required: the requirements for the degree are stated on pages 87-91. The  
 thirty hours of required work must include a minimum of eighteen hours in  
 third-group courses.

### FIRST GROUP

#### 1-2 *Man in Modern Society*\* (3-3)

The Staff

*First half:* fall—morning and evening; spring—morning; summer 1957  
*Second half:* spring—morning and evening

Origins and development of culture; the impact of groups and institu-  
 tions on man's social behavior. Factors producing social problems;  
 individual, community, national, and international disorganization.

### SECOND GROUP

#### 121 *Cultural Anthropology* (3)

Geisert

Fall—morning.

Origins and development of social life and customs; organization and  
 structure of primitive human relationships; the dynamics of culture  
 patterns.

#### 122 *Culture and Personality* (3)

Stephens

Spring—evening.

Influences of group membership and cultural conditions on personality;  
 social-cultural factors in mental health; and the relationship of person-  
 ality to race, class, and occupation.

\* Sociology 1 is prerequisite to all other courses in Sociology.



- 123 *Fields of Social Work* (3) Sheldon  
1957-58 and alternate years; fall—evening.  
Introduction to the nature and scope of social work; the development of social work programs, functions of social case work, social group work, and social action.
- 124 *Public Welfare* (3) Sheldon  
1957-58 and alternate years; spring—evening.  
Organization of public welfare—federal, state, and local; the care of various classes of dependents and methods of treatment, personnel, finance, and public relations.
- 126 *Urban Sociology* (3)  
1958-59 and alternate years.  
Factors in the growth of cities; problems of urban living, group life, community, urban housing, and city planning.
- 127 *Community Organization* (3) Geisert  
1957-58 and alternate years; spring—morning.  
Social interaction and social organization in American communities, dynamics of leadership, methods of examining social forces to meet community needs.
- 131 *Social Institutions* (3)  
1958-59 and alternate years.  
Functional analysis of basic social institutions: family, education, religion, and state in the structure of American society.
- 132 *Courtship and Marriage* (3) Lavell  
Spring—morning.  
Dating and courtship as social processes, grounds for marriage, marriage laws, mate selection, factors in marriage adjustment, prediction and counseling.
- 133 *The Family in Modern Society* (3) Lavell  
Fall—morning.  
Historical development of the family as a social institution, parent-child relations, family problems, disorganization and divorce, and family reorganization.
- 134 *Sociology of Child Development* (3)  
1958-59 and alternate years.  
Socialization of the child through the home and other social institutions, the changing status of orphaned, dependent and handicapped children.

135-36 *Crime and Delinquency* (3-3)

Geisert

Academic year—morning.

Nature and distribution of crime, factors producing criminal behavior, police and court systems, treatment and prevention of crime.

141 *Population Problems* (3)

Stephens

Fall—evening.

Composition of populations, theories and trends in population growth, factors producing population movements, effects of migration, population policies.

151 *Human Relations in Industry* (3)

Lavell

Fall—evening.

Sociological analysis of work situations, occupational mobility, development of the labor movement, industrial relationship and morale.

161 *Social Stratification; Class and Status* (3)

1958-59 and alternate years Summer 1957.

Nature of class structure, patterns of status, prestige relations in American society, differential class behavior, and analysis of changing social structure.

162 *Social Movements* (3)

1958-59 and alternate years

Major contemporary movements examined as aspects of social change and collective behavior. Designed to discuss competing theories and to show the way in which social movements develop.

164 *Social Control* (3)

Lavell

Spring—evening, summer 1957.

Informal and formal phases of human control, analysis of methods of control used in modern society and the situations in which they occur, policies and techniques of control.

172 *Contemporary Social Theory* (3)

Stephens

Spring—morning.

Systematic study of the important schools of contemporary sociology, including recent European as well as American developments, an evaluation of the scientific content, merits of each school.

181 *Methods of Social Research* (3)

Stephens

Fall—evening.

Analysis of social research techniques and the scientific method, application to special types of the case study, social survey, statistical, sociometric, and experimental methods.

- 221 *Seminar: Current Trends in Sociology* (3)  
1958-59 and alternate years.  
Analysis and evaluation of recent theories of social systems and an appraisal of the roles of systematic theory in sociology.
- 222 *Seminar: Anthropological Theory* (3)  
1958-59 and alternate years.  
Analysis of the theoretical postulates and assumptions underlying the development of modern cultural anthropology, the concepts of culture, cultural dynamics, and cultural integration.
- 224 *Seminar: Social Case Work for Rehabilitation Workers* (3)  
Spring—evening.  
Nature, functions, and techniques for social case work. Interviewing, integration of information about patient or counsellee, relationship of social case work to other techniques.
- 225 *Seminar: Community Organization and Resources* (3)  
Fall—evening.  
Study of the organization of social agencies in a community, how to use social agencies, problems of inter-agency cooperation, relationship to rehabilitation counseling.
- 227 *Seminar: Small Groups* (3) Geisert  
Fall—evening.  
General characteristics of small groups and their measurement, sociography of groups, evaluation of small group theory and sociometry, other techniques of group research.
- 228 *Seminar: Mass Communications* (3) Geisert  
Spring—evening.  
The communication process, barriers to communication; structure and function of communication in society; content, control, support, and effects of mass communication.
- 295-96 *Research* (arr.) The Staff  
Academic year—as arranged, summer 1957.
- 297-300 *Thesis* (3-5) The Staff  
Academic year—as arranged, summer 1957.



## SPEECH

Lubin Poe Leggette, A.M., Ed.D., *Depew Professor of Speech, Executive Officer*

Calvin Weir Pettit, Ph.D., *Professor of Speech; Director of Speech Clinic*

George Francis Henigan, Jr., Ph.M., *Associate Professor of Speech*

\*Edwin Lockwood Stevens, A.M., *Associate Professor of Speech*

Lee Sheward Bielski, A.M., *Assistant Professor of Speech*

Edith Shores Surrey, A.M., *Lecturer in Speech*

Fred Wohlwend Stuart, *Lecturer in Speech*

Andrew Anthony Nilles, A.B., LL.B., *Lecturer in Speech*

Marion Toulmin Gaines III, A.B., *Lecturer in Speech*

Bernard Anderman, A.M., Ed.D., *Lecturer in Speech*

Stanley Louis Berlinsky, Ph.D., *Lecturer in Speech*

Cleo Michelsen, A.M., *Associate in Speech*

*Bachelor of Arts with a major in Speech (Columbian College—Department II).*  
—Prerequisite: the Arts and Letters curriculum in the Junior College, see page 66, including Speech I, 2, 11, 32.

Required: the general requirements as stated on pages 8-86, including the passing of a speech proficiency test early in the program, Speech 101, 121, 154, 171, and a minimum of twelve additional hours in second-group courses in the speech arts in speech classes as approved by the adviser.

*Bachelor of Arts with a major in Dramatic Art (Columbian College)—Prerequisite:* the Arts and Letters curriculum in the Junior College, see page 66, including twelve hours of the basic course in speech and six hours in English 51-54, 71-73, or 91-92.

Required: the general requirements as stated on pages 8-86, including the passing of a speech proficiency test early in the program, Speech 101, a minimum of nine additional hours in dramatic arts in the Speech Department and four hours in dramatic literature in the English Department, as approved by the adviser.

*Bachelor of Arts in Education with a teaching field in Speech (School of Education)—Prerequisite:* the Education curriculum, page 68.

Required: the Speech option, page 101, and the educational courses listed on pages 104-73.

*Master of Arts in the field of Speech Correction (Columbian College)—Prerequisite:* the degree of Bachelor of Arts with a major in Speech from this University, or the equivalent.

Required: the general requirements as stated on page 87-91.

### FIRST GROUP

#### A Speech Clinic

Pott and Staff

Fall—as arranged, spring—as arranged, summer 1957.

Individual or group lessons, without academic credit, for such speech difficulties as lisp, stammer, cleft palate, articulatory problems, and stuttering. Fee for individual lesson, \$7; for group lesson, \$4.

\* On additional hour 1956-57.



B *American Speech for Foreign Students* (3) Bielski

Fall—evening; spring—as arranged, summer 1937.

Class limited to foreign-born students. Instruction in the formation of the sounds of spoken English, with emphasis on rhythm and intonation. The International Phonetic Alphabet is used. Recording fee, \$5.

1 *Effective Speaking* (3) Leggette and Staff

Fall—morning, afternoon, and evening; spring—morning, afternoon, and evening, summer 1937.

Preparation and delivery of extemporaneous speeches, developing confidence and poise, body and voice control, selecting and organizing material. Recording fee, \$4.

2 *Persuasive Speaking* (3) The Staff

Fall—evening; spring—morning and evening.

A continuation of Speech 1, which is persuasive, with emphasis on speech composition and elementary problems of persuasion.

11 *Voice and Diction* (3) The Staff

Fall—morning, afternoon, and evening; spring—morning and evening, summer 1937.

Developing ease, naturalness, and clarity in the speaking voice. Analysis of individual voices through recordings. Phonetic approach to the study of the sounds of English, the standards of speech. Class instruction in the problems of rate, volume, pitch, and quality. Recording fee, \$4.

32 *Oral Reading* (3) The Staff

Fall—morning; spring—morning, summer 1937.

Reading to others, theory and practice in the problems of interpreting the printed page. Prerequisite: Speech 11 or the permission of the instructor. Recording fee, \$4.

## SECOND GROUP

101 *Voice and Phonetics* (3) Bielski

Fall—evening.

The International Phonetic Alphabet and its application to the student's own speech improvement, and general application to such fields as theater, public speaking, speech correction, radio, and foreign languages. Recording fee, \$4.

- 102 *Oral Interpretation of Literature* (3) Leggette  
Not offered 1957-58.  
Theory and practice in the problems of communicating meaning and emotion. Selections for study include poetry and prose. Prerequisite: Speech 32 or permission of the instructor. Recording fee, \$4.
- 121 *Group Discussion and Conference Leadership* (3) Stevens  
Fall—afternoon; summer 1957  
The process of thinking and problem solving in committees and small groups, and the methods of leading discussions and conferences. Prerequisite: 6 hours of speech or the permission of the instructor.
- 126 *Public Discussion and Debate* (3) Henigan  
Spring—afternoon.  
Principles and types of public discussion and debate; practice in argumentative speaking on questions of current interest. Prerequisite: 6 hours of speech or the permission of the instructor.
- 133-34 *Radio and TV Broadcasting* (3-3) Stuart  
Academic year—evening  
Industrial development, station organization and management, equipment, production techniques; practice in preparation and presentation of programs. Admission by permission of the instructor. Recording fee, \$8 a semester.
- 141 *Speeches for Special Occasions* (3) Henigan  
Not offered 1957-58.  
The preparation and presentation of speeches for formal occasions with emphasis on the psychology of the audience. Prerequisite: 6 semester hours of speech.
- 145 *Speech Criticism* (3) Henigan  
Fall—morning.  
A study of rhetorical theory with application to the criticism of representative American and British oratory. Prerequisite: permission of the instructor.
- 153 *Acting* (3) Leggette  
Fall—afternoon  
Study and practice in the fundamentals of acting technique. Prerequisite: permission of the instructor. Laboratory fee, \$5.

154 *Play Production* (3)

Leggette

Spring—afternoon.

Fundamentals of play production. Under the supervision of the instructor, students prepare one-act plays for presentation. Prerequisite: permission of the instructor. Laboratory fee \$5.

155-56 *Play Production Practice* (1-1)

The Staff

Academic year—as arranged.

Practical work in theater.

166 *History of the Theater* (3)

Nilles

Spring—evening.

A general survey of the rise of the theater: the Classical, Medieval, Renaissance, later English and Continental, and the Modern theater. Admission by permission of the instructor.

169 *Creative Dramatics and Children's Theater*  
(3)

Michelsen

Fall—evening; spring—evening.

A study of creative dramatics and its use as a learning tool, with problems and experience in producing children's plays.

175-76 *Speech Correction* (3-3)

Pettit

Academic year—evening.

A study of the causes of the disorders of speech with emphasis on methods in diagnosis and treatment of defective speech. Admission by permission of the instructor.

177-78 *Clinical Practice in Speech Therapy* (1-1)

The Staff

Academic year—as arranged; summer 1957.

Supervised case work in remedial speech—the University Speech Clinic, District of Columbia Cerebral Children's Society, and public school system. This course may be repeated for a total of 6 semester hours. Prerequisite: Speech 175.

182 *Introduction to Hearing Problems* (3)

Not offered 1957-58.

A study of the field of audiology including anatomy of the ear, tests of hearing, speech reading, and auditory training. Admission by permission of the instructor.



183-84 *Clinical Practice in Hearing Therapy* (1-1) Anderman and Staff

Academic year—as arranged; summer 1957.

Supervised case work with persons handicapped with hearing losses—the University Speech Clinic and the Washington Hearing Society. This course may be repeated for a total of 3 semester hours. Prerequisite: Speech 182.

191 *Proseminar: Speech Correction* (3) The Staff  
Fall—evening.

THIRD GROUP

276 *Advanced Speech Correction* (3) Pettit  
Spring—evening.

Prerequisite: Speech 175.

280 *Speech Pathology* (3) Pettit  
Spring—evening.

An advanced study of the causes and symptoms of the major physiologic and psychogenic disorders. Admission by permission of the instructor.

286 *Seminar in Speech Pathology* (3) Pettit  
Spring—evening.

295-96 *Research in Speech and Hearing* (arr.) The Staff

299-300 *Thesis* (3-3) The Staff

COURSE OFFERED IN SPECIAL PROGRAM

In addition to the regular courses announced above, the University offers the following course especially for students enrolled in the Engineering Administration Program.

212 *Communication of Ideas II* (3)

RELATED COURSES IN OTHER DEPARTMENTS

English 125, *Evolution of Modern Speech*

English 135-36, *Shakespeare*

English 175-76, *American Drama*

English 183-84, *English Drama*

Education 133-34, *Observation and Student Teaching*



## STATISTICS

Frank Mark Weida, Ph.D., *Professor Emeritus of Statistics in Residence*

Everett Hershel Johnson, Ph.D., *Professor of Statistics, Acting Executive Officer*

Solomon Kullback, Ph.D., *Professorial Lecturer in Statistics*

*Associate Professor of Statistics*

Chester Hayden McCall, Jr., Ph.D., *Assistant Professor of Statistics*

*Bachelor of Arts or Bachelor of Science with a major in Mathematical Statistics (Columbian College—Field of Study)*—Prerequisite: the Arts and Letters or the Science curriculum, respectively, in the Under College; see pages 76 and 97. Electives must include Mathematics 12, 16, and 20, Statistics 91-92, and Philosophy 121 and 122.

Required: the general requirements stated on pages 82-86, including Statistics 117, 118, 155-56, 157-58, and 167-68, a minimum of twenty-four semester hours of approved courses in departments in the Division of Mathematics and the Physical Sciences or in departments in the Division of the Natural Sciences or in departments unrelated to Statistics; and the grade of "pass" on the major examination at the end of the senior year. For further details, consult the adviser.

*Master of Arts or Master of Science in the field of Mathematical Statistics (Columbian College)*—Prerequisite: a Bachelor of Arts or Bachelor of Science degree, respectively, with a major in Statistics at this University, or the equivalent.

Required: the general requirements as stated on pages 87-91. The required thirty semester hours, in addition to a thesis in Statistics, include at least twenty hours to be selected from approved third-group courses in Statistics. The remaining twelve hours may be selected from graduate work offered by departments in the Division of Mathematics and the Physical Sciences or by departments in the Division of the Natural Sciences with the approval of the adviser.

*Doctor of Philosophy (Graduate Council)*—See page 97.

*Bachelor of Arts in Government and Master of Arts in Government with a major in Business and Economic Statistics (School of Government)*—See pages 85-86, 100, 101-93, 105.

### FIRST GROUP

#### 51 *Introduction to Business and Economic Statistics* (3)

The Staff

Lecture (2 hours), laboratory (2 hours).

Fall: lecture—morning and evening, laboratory—afternoon and evening, spring—morning and evening, summer 1957.

Survey of elementary principles and procedures for presenting, analyzing, and interpreting statistical data; consideration of characteristic values, measures of variability, sampling processes, index numbers, time series analysis, and simple correlation. Prerequisite: one college unit in algebra. Laboratory fee, \$2.

52 *Mathematics of Finance* (3)

The Staff

Fall—morning and evening; spring—morning, afternoon, and evening; summer 1957.

Interest and discount, annuities, valuation of stocks and bonds, sinking funds, amortization, valuation of depletable assets, depreciation, building and loan associations. Prerequisite: one entrance unit in algebra.

53 *Introduction to Statistics in Psychology and Education* (3)

The Staff

Lecture (2 hours), laboratory (2 hours).

Fall: lecture—morning and evening, laboratory—afternoon and evening; spring—morning, summer 1957.

Sources of data, tabulation, charts and graphs, averages, dispersion, quartiles and percentiles, raw scores and derived scores, profiles, norms and their use, frequency distributions, intelligence and other quotients, reliability and validity of tests, normal curve, correlation, elementary sampling, statistical error, limitations of statistics. Prerequisite: one entrance unit in algebra. Laboratory fee, \$2.

91-92 *Principles of Statistical Methods*\* (3-3)

A year course; credit is not given for the first half until the second half is completed.

Academic year: lecture (2 hours), laboratory (2 hours)—evening; summer 1957.

The meaning, uses, and applications of variates and attributes; measurement and enumeration; averages and dispersion; frequency distributions and their characteristics; errors of measurement and their control; purposive and random sampling in theory and practice and their errors and estimates; correlation theory and applications; power functions; Type I and II errors; introduction to analysis of variance and the making of statistical decisions. Prerequisite: one entrance unit in algebra. Laboratory fee, \$9 a semester.

## SECOND GROUP

125 *Statistics in Psychology and Education* (3)

McCall

Spring: lecture (2 hours), laboratory (2 hours)—morning.

Advanced study of statistical technique necessary for an application of statistics in research problems. Analysis of variance, correlation techniques, chi-square application, and sampling theory. Application to specific problems utilizing case method of study in so far as possible. Original work is required of each student. Prerequisite: Statistics 53. Laboratory fee, \$2.

\* Statistics 91-92 is for Statistics majors, for students in engineering and in the biological and physical sciences.

106 *Factor Analysis* (3)

McCall

Fall—morning.

Matrix theory and linear algebras as applied to factor analysis, introduction to the concepts of factor analysis, their utility in various phases of research. Case method of study applied in so far as possible. Original work is required of each student. Prerequisite: Statistics 53 or the equivalent.

109 *Managerial Statistics* (3)

Not offered 1957-58.

Role of statistics and the contribution of statistical procedures in various phases of business management with emphasis on the need for and usefulness of the statistical method rather than the mechanics of analysis. Subject matter comprises sources and methods for collecting data, effective forms of presentation, techniques for summarizing and analyzing quantitative and qualitative information, interpretation of and inferences from available data. Admission by permission of the instructor or following Statistics 51.

110 *Quality Control Techniques* (3)

Not offered 1957-58.

Characteristics; scientific basis, reduction in cost of inspection, rejections, and tolerance limits, policy as an attribute, distribution of quality characteristics, laws basic to control, statistical and maximum control; detection of lack of control. Admission by permission of the instructor or following Statistics 51.

111 *Business and Economic Statistics I* (3)

Johnson

Fall—morning and evening

Statistical processes as related to particular types of problems encountered in business administration and economic research. Subject matter comprises characteristic values, measures of variability, sampling processes, sampling distributions, and simple correlation. Admission by permission of the instructor.

112 *Business and Economic Statistics II* (3)

Johnson

Spring—morning and evening.

Application of statistical methods to specific problems of business administration and economics. Subject matter comprises multiple and partial correlation, time series analysis, index numbers, business cycles, demand functions, and depreciation schedules. Prerequisite: Statistics 111 or the equivalent.

117 *Analysis of Variance I* (3)

Fall—evening; summer 1957

The analysis of variance to segregate factors producing significant variation; a method to estimate experimental error; multiple classifica-



tions, Latin Square, Greco Latin Square. Includes an introduction to model theory. Applications are stressed. Prerequisite: Statistics 91-92.

### 118 *Correlation and the Chi-square Test I* (3)

Spring—evening; summer 1957.

A study of simple, partial, and multiple correlation. Rank correlation, the method of cross-tabulation, and analysis of covariance. Tests of independence, likeness, and goodness of fit. Applications are stressed. Prerequisite: Statistics 91-92.

### 121 *Index Numbers* (3)

Not offered 1957-58.

Definition and theory of index numbers, methods of construction, their interpretation, use, and limitations. Prerequisite: Statistics 51 or the equivalent.

### 122 *Business Conditions, Forecasting Principles and Techniques* (3)

Johnson

Spring—morning

Survey and appraisal of techniques for measuring the state of business conditions and an examination of current forecasts. Study of procedures for estimating future values, namely, trend, seasonality, price levels, or level of general business activity. Prerequisite: Statistics 51 or the equivalent.

### 157-58 *Mathematical Probability* (3-3)

McCall

A year course; credit is not given for the first half until the second half is completed.

Academic year—evening

Definition, enumeration of cases, total and compound probability, repeated trials, Bayes' theorem and postulate, Bernoulli's theorem and its experimental verification, mathematical expectation, law of large numbers and its applications. Prerequisite: Mathematics 28 and Statistics 91-92.

### 157-58 *Mathematical Statistics* (3-3)

McCall

A year course; credit is not given for the first half until the second half is completed.

Academic year—evening

Statistics as a science, types of problems, relative frequency and probability, binomial and multinomial distributions, Pearson system of curves, Gamma-Charlier series, Cauchy distributions, application to sampling method, Lewis theory of dispersion, generating functions, simple sampling theory, moments and cumulants. Prerequisite: or concurrent registration: Statistics 111-45.



- 195-96 *Reading and Research in Business and Economic Statistics* (3-3) Johnson  
Academic year—as arranged  
Admission: by permission of the instructor
- 197 *Statistical Mathematics I*\* (3) Weida  
Fall—evening.  
Research problems in statistics with the development of processes from modern algebra necessary as a test for their solution. Prerequisite: Mathematics 20 or the equivalent.
- 198 *Statistical Mathematics II*\* (3) Weida  
Spring—evening.  
Research problems in statistics with the development of processes from analysis necessary as a test for their solution. Prerequisite: Mathematics 20 or the equivalent.
- 199-200 *Proseminar: Theoretical and Applied Statistics* (3-3) Weida  
Academic year—as arranged  
In addition to the study of recent advances in statistical methods, this course is designed to emphasize the content of the baccalaureate major. Admission: by permission of the instructor.

## THIRD GROUP\*

- 201 *Design of Experiments* (3) Not offered 1957-58  
Relative merits of random, repeated, stratified, and double sampling; Fisher-Pearson method of randomization; randomized blocks; Latin square; factorial design; confounding; partial confounding.
- 202 *Theory of Estimation and Testing Hypotheses* (3) Not offered 1957-58  
Statistical hypotheses; maximum likelihood estimate; Markoff's best estimate; Neyman-Pearson theory of testing hypotheses; Bayes' theory; consistent, efficient, and sufficient statistics; theory of confidence intervals.
- 203-4 *The Theory of Econometrics* (3-3)  
A year course; credit is not given for the first half until the second half is completed.  
Not offered 1957-58  
Statistical methods applied to analysis of production, supply, and de-

\* Statistics 195 and 198 are prerequisite to all third-group courses.

mand; utility and disutility; interest and taxation; exchange. Emphasis on interpretation of results in terms of probability, correlation, and regression of time series. Admission by permission of the instructor.

105-6 *Advanced Business and Economic Statistics (3-3)*

Not offered 1957-58.

Application of statistical methods to specific problems utilizing one method where possible. Emphasis on source materials, role of statistical methods, techniques of analysis, interpretation and presentation of results. Original work is required of each student. Prerequisite: Statistics 112 or the equivalent.

207 *Operations Analysis (3)*

Not offered 1957-58.

Basic concepts and techniques of operations analysis as applied to problems in business management and economic research. An introduction to the practices of linear programming, queue theory, and waiting theory. Admission by permission of the instructor.

217 *Analysis of Variance II (3)*

Not offered 1957-58.

Advanced theory of the applications of the linear hypothesis to the search process. Delineations of the analysis of variance. Extension to multiple classifications with unequal cell frequencies. Studies of multiple contrasts and their importance. Normal versus non-normal problems.

218 *Correlation and the Chi-square Test II (3)*

Not offered 1957-58.

Theoretical analysis of simple, partial, and multiple correlation. Examination of various distributions encountered. Rank correlation techniques and their distributions. Distribution of the chi-square statistic.

257-58 *Advanced Mathematical Statistics (3-3)*

Kullback

A year course; credit is not given for the first half until the second half is completed.

Academic year—evening.

Mathematical basis of distribution functions, moments and cumulants, probability and likelihood, sampling distributions exact and approximate. Chi-square distribution, association and contingency, various conceptions of correlation, individual difference problem, time series, regression analysis, analysis of variance, theories of inference.

259-60 *Advanced Mathematical Probability (3-3)*

A year course; credit is not given for the first half until the second half is completed.

Not offered 1957-58.

Modern theories and asymptotic laws; elementary theory of definite integration; limit theorems in probability; the contributions of Cauchy, Fréchet, Kolmogoroff, Khintchine. Prerequisite: Statistics 257-58 or the equivalent.

263-64 *Statistical Inference (3-3)*

A year course; credit is not given for the first half until the second half is completed.

Not offered 1957-58.

Sample space; methods for estimating population parameters; fiducial inference and its application to testing hypotheses; valid efficient and exact estimators; Student's distribution; binomial distribution; sampling statistics; i.e., moments and moments used as estimates of population parameters and used to test hypothesis. Prerequisite: Statistics 257-58 or the equivalent.

265-66 *Multivariate Analysis (3-3)*

A year course; credit is not given for the first half until the second half is completed.

Not offered 1957-58.

Tests of significance, generalized variance and covariance, tests of independence, canonical and vector correlations, multivariate normal distribution, generalized Student's ratio, problems of estimation, applications to factor analysis.

267-68 *Characteristic Functions (3-3)*

A year course; credit is not given for the first half until the second half is completed.

Not offered 1957-58.

Fourier integrals, set functions, inverse formulas, limit theorems, applications to the distribution problem in statistics.

269-70 *Sequential Testing and Statistical Decision Theory (3-3)*

A year course; credit is not given for the first half until the second half is completed.

Not offered 1957-58.

Efficiency of sequential tests, sequential probability ratio test, expected number of observations necessary for a decision, truncated sequential analysis, sequential tests of significance proposed by, others, general structure of statistical games, illustrating principle of statistical games, optimal strategies, estimation for statistical decision.



271-72 *Statistical Information Theory* (3-3)

Kullback

A year course; credit is not given for the first half until the second half is completed.  
Academic year—evening.

Basic concepts, definitions, and formulas of information theory, their significance and general properties. Shannon's coding theorem, channel capacity, and transmission of information; inequalities of information theory and sufficiency; applications to statistical problems of discrimination and hypothesis testing; asymptotic distribution theory of information; analysis of contingency tables; loss of information due to grouping and sequential analysis; comparison of experiments.

295-96 *Reading and Research* (3-3)

Weale

Academic year—as arranged.

Admission by permission of the instructor.

299-300 *Thesis* (3-3)

Weale

## COURSES OFFERED IN SPECIAL PROGRAMS

In addition to the regular courses announced above the University offers the following courses especially for students enrolled in the following special programs: Navy Graduate Comptrollership Program, Air Force Advanced Management Program, and Engineering Administration.

119 *The Basis of Statistical Decision Making* (3)

Introduction to the techniques of decisionmaking, with emphasis on applications rather than theory. Includes binomial distribution, normal distribution, Type I and II errors, estimation, research methodology, and problems of inference.

120 *Principles of Statistical Analysis* (3)

Introduction to the basic concepts of statistical analysis, measures of central tendency, dispersion, normal distribution, least-squares inference including estimation and testing hypotheses. Examples utilizing actual case studies in so far as possible.

212 *Managerial Statistics, Standardization, and Quality Control* (3)

Fundamental methods of analysis of general business problems, forecasting, statistical control techniques in management, principles, statistics, and utility of standardization. Acceptance sampling, various purposive control charts, concepts of quality control as an industrial and administrative safeguard.



## SURGERY

- Brian Blades, A.B., M.D., *Professor of Surgery, Executive Officer*  
 Arch Lockhart Riddick, B.S., M.D., *Clinical Professor of Surgery*  
 John Gordon Lee, A.B., M.D., C.M., Med. Sc.D., *Clinical Professor of Surgery*  
 Robert Tuthill Gants, B.S., M.D., *Clinical Professor of Surgery*  
 Herbert Hermann Schoenfeld, M.D., *Associate Clinical Professor of Surgery*  
 Alec Horwitz, M.S., M.D., *Associate Clinical Professor of Surgery*  
 William Stanley McCune, A.B., M.D., *Associate Clinical Professor of Surgery*  
 Walter Henry Gerwig, Jr., A.B., M.D., *Associate Clinical Professor of Surgery*  
 Vincent Michael Iovine, B.S., M.D., *Associate Clinical Professor of Surgery*  
 Owen Gwathmey, A.B., M.D., *Assistant Professor of Surgery*  
 Howard Clemeth Pierpont, A.B., M.D., *Assistant Professor of Surgery*  
 Benjamin Franklin Dean, Jr., M.S., M.D., *Assistant Clinical Professor of Surgery*  
 Carl Berg, M.D., *Assistant Clinical Professor of Orthopedic Surgery*  
 Calvin Trexler Klopp, A.B., M.D., *Assistant Clinical Professor of Surgery*  
 Julius Salem Nevilaser, A.B., M.D., *Assistant Clinical Professor of Orthopedic Surgery*  
 Jerome Blaine Harrell, M.D., *Assistant Clinical Professor of Surgery*  
 Leonard Theodore Petersen, B.S., M.D., *Assistant Clinical Professor of Orthopedic Surgery*  
 John Plath Adams, B.S., M.D., *Assistant Clinical Professor of Orthopedic Surgery*  
 Gordon Sparks Letterman, B.S., M.D., *Assistant Clinical Professor of Surgery*  
 William Ross Morris, M.D., *Associate in Surgery*  
 Jacob Joseph Weinstein, B.S., Pharm.G., M.D., *Associate in Surgery*  
 William Carey Meloy, M.D., M.S. in Med., *Associate in Surgery*  
 Edward Alexander Catritz, M.D., *Associate in Surgery*  
 Karl Hayden Wood, Pharm.G., D.D.S., *Associate in Dental Surgery*  
 Isabella Harrison, A.B., M.D., *Associate in Surgery*  
 Henry Leon Fetter, A.B., M.D., *Associate in Orthopedic Surgery*  
 James R. Hard Thier'schwaite, B.S., M.D., *Associate in Surgery*  
 Paul Charles Aakins, A.B., M.D., *Associate in Surgery*  
 George Jerome Magoyera, M.D., *Instructor in Surgery*

Crenshaw Douglas Briggs, B.S., M.D., *Clinical Instructor in Surgery*  
 Joseph Francis Conlon, D.D.S., *Clinical Instructor in Dental Surgery*  
 Duane Case Richtmeyer, A.B., M.D., *Clinical Instructor in Surgery*  
 Leon Gerber, M.D., *Clinical Instructor in Surgery*  
 Thomas Bradley, A.B., M.D., *Clinical Instructor in Surgery*  
 Ernest Alva Gould, B.S., M.D., *Clinical Instructor in Surgery*  
 Austin Bertram Rohrbaugh, Jr., M.D., *Clinical Instructor in Orthopedic Surgery*  
 Marvin Hayne Kendrick, A.B., M.D., *Clinical Instructor in Surgery*  
 Brooks Gideon Brown, B.S., M.D., *Clinical Instructor in Surgery*  
 John Decator Hoyle, B.S., M.D., *Clinical Instructor in Surgery*  
 Robert Roland Smith, B.S., M.D., *Clinical Instructor in Surgery*  
 Norman Harry Isaacson, A.B., M.D., *Clinical Instructor in Surgery*  
 Charles Stanley White, Jr., B.S., M.D., *Clinical Instructor in Surgery*  
 Dennis Parfremment McCarty, M.D., *Clinical Instructor in Surgery*  
 John Mark Keshishian, M.D., *Clinical Instructor in Surgery*  
 Maxine Ann Schurter, A.B., M.D., *Clinical Instructor in Surgery*

101-2 *Surgical Anatomy I*

Surgery and Anatomy Staff

Academic year—1 hour alternate weeks, as arranged.

Closely illustrating relationship between gross anatomy and clinical surgery. University Hospital.

280 *Introduction to Surgery*

The Staff

Spring—1 hour a week.

Lectures and relations covering the field of general surgery.

284 *Surgical Physiology*

The Staff

Spring—2 hours a week.

A clinical and laboratory course with particular emphasis on applied physiology.

323-24 *Surgical Pathology I*

Weiss

Academic year—1 hour a week.

Weekly conferences are held with the student group assigned to the subject, for discussion of gross and microscopic specimens.

373-74 *Clinical Clerkship I*

The Staff

Academic year—as arranged.

The student is assigned and required to work up thoroughly the cases for diagnosis and treatment. D. C. General Hospital.

- 375-76 *Outpatient Surgical Clinic* The Staff  
Forty hours as arranged during academic year.  
Surgical clinic. D. C. General Hospital.
- 377-78 *Orthopedics* The Staff  
Academic year: lecture—1 hour a week, ward rounds—7½ hours a week, in rotation.  
D. C. General Hospital.
- 379-80 *Surgical Staff Conferences I* The Staff  
Academic year—Tuesday as arranged.  
D. C. General Hospital.
- 383-84 *Surgical Clinic I* Blades  
Academic year—1 hour a week.  
Demonstration of various surgical diseases to the entire Class. University Hospital.
- 473-74 *Clinical Clerkship II* The Staff  
Academic year—in rotation.  
Six weeks, University Hospital, three weeks, Mt. Alto Hospital.
- 479-80 *Surgical Staff Conferences II* The Staff  
Academic year—Wednesday as arranged.  
University Hospital.
- 483-84 *Surgical Ward Rounds* Blades  
Academic year—1 hour a week.  
Demonstration of various surgical diseases to fourth-year clerks. University Hospital.
- 491 *Surgical Anatomy II* Horwitz and Staff  
Fall—1 hour a week for twelve weeks in rotation.  
Lectures for fourth-year clerks. University Hospital.
- 492 *Surgical Pathology II* Newman  
Spring—1 hour a week.  
A systematic study of the gross and microscopic changes in the organs and tissues commonly removed surgically.
- 497-98 *Surgical Clinic II* The Staff  
Academic year—2 hours a week.  
Conferences at Walter Reed Hospital for fourth-year clerks assigned to the University Hospital.



## UROLOGY

Frederick A. Reuter, M.D., *Professor of Urology, Executive Officer*  
 Thomas Carlton Thompson, B.S., M.D., *Clinical Professor of Urology*  
 Edward Egner Ferguson, M.D., *Associate Clinical Professor of Urology*  
 Leon Richard Culbertson, B.S., M.D., *Associate Clinical Professor of Urology*  
 William Dabney Jarman, B.S., M.D., *Assistant Clinical Professor of Urology*  
 Gilbert Ottenberg, A.M., M.D., *Associate in Urology*  
 Gordon Rhodes MacDonald, B.S., M.D., *Associate in Urology*  
 Frederick Turner Reuter, M.D., *Associate in Urology*  
 Herbert DeGrange Wolff, Jr., M.D., *Clinical Instructor in Urology*  
 Hamilton Peacock Dorman, B.S., M.D., *Clinical Instructor in Urology*  
 Arthur Wilets, A.B., M.D., *Clinical Instructor in Urology*

### 395-96 Clinic

The Staff

Clinical teaching and demonstrations on the care of urological cases with special emphasis on the pre- and post-operative management. Operative clinics and clinical teaching. D. C. General Hospital.

### 397 Urology

F. A. Reuter and Staff

Fall—1 hour a week.

Lectures covering the entire field of urology including diagnosis, treatment, and medical pathology.

### 495-96 Clinic

F. A. Reuter and Staff

Three hours a week, in rotation as arranged during academic year.

Clinical demonstrations, teaching in the Outpatient Department, and urological X-ray conferences with special attention given to diagnostic procedures. University Hospital.



## ZOOLOGY\*

Ira Bowers Hansen, Ph.D., *Professor of Zoology, Executive Officer*  
 Edith Elizabeth Mortensen, Ph.D., *Professor of Zoology*  
 Kenneth Casper Kates, Ph.D., *Professorial Lecturer in Zoology*  
 Alton Harold Desmond, Ph.D., *Assistant Professor of Zoology*

*Bachelor of Arts or Bachelor of Science (Columbia College—Field Study)*—Prerequisite: the Arts and Letters or the Science requirement, respectively, in the Junior College, see pages 66-67, including Zoology 1-2.

Required: the general requirements as stated on pages 80-86, and the grade "pass" on the Zoology major examination at the end of the senior year. The correlated knowledge upon which the student will be examined includes the following fields: (1) classification, structure, and ecological relations of animals; both invertebrate and vertebrate; (2) embryology, development and life histories of important animal types; (3) general principles of physiology, heredity, and evolution; (4) the development of biological sciences, hypotheses, and theories as revealed in the study of the history of zoology.

*Master of Art or Master of Science in the Field of Zoology (Columbia College)*—Prerequisite: the degree of Bachelor of Arts or Bachelor of Science, respectively, with a major in Zoology at this University, or the equivalent.

Required: the general requirements as stated on pages 87-91.

*Doctor of Philosophy (Graduate Course)*—See page 97.

### FIRST GROUP

#### 1-2 *Introduction to Zoology* (4-4) Mortensen, Hansen

Autumn year: lecture (2 hours)—morning and evening laboratory (4 hours)—morning afternoon, and evening sessions 1937.

An introduction to the study of the structure, function, and relation of animals, and of the fundamental biological principles involved. Material fee, \$11 a semester.

#### 41-42 *Comparative Vertebrate Anatomy* (3-3) Desmond

Lecture (1 hour), laboratory (4 hours).

1937-38 and alternate years: autumn year—morning, 1938-39 and alternate years: autumn year—morning and evening.

Lectures on the organ systems of the vertebrates, laboratory dissection of types. Prerequisite: Zoology 2. Material fee, \$11 a semester.

\* See also the departments of Biology and Botany.

## SECOND GROUP

- 101-2 *Invertebrate Zoology* (3-3) Mortensen  
 Lecture (1 hour), laboratory (4 hours).  
 1947-48 and alternate years: academic year—afternoon, 1948-49 and alternate years: academic year—evening.  
 A systematic study of invertebrate forms, including the morphology, classification, life histories, and phylogenetic relationships. Occasional field trips. Prerequisite: Zoology 1-2 or Biology 1-2. Material fee, \$8 a semester.
- 105 *Entomology* (3) Munson  
 1947-48 and alternate years: Fall, lecture (1 hour), laboratory (4 hours)—evening.  
 A study of the elementary morphology, physiology, and ecology of insects, with an introduction to the taxonomy of the more common ones. Prerequisite: Zoology 1-2 or the equivalent. Material fee, \$8.
- 138 *Herpetology* (3) Deansford  
 Lecture (1 hour), laboratory (4 hours).  
 1947-48 and alternate years: spring—evening; 1948-49 and alternate years: spring-afternoon, summer 1949.  
 An introduction to the microscopical anatomy of internal tissues and organs. Prerequisite: Zoology 1-2. Material fee, \$11.
- 145 *Introduction to Vertebrate Embryology* (3) Hansen  
 Lecture (1 hour), laboratory (4 hours).  
 1947-48 and alternate years: fall—evening; 1948-49 and alternate years: fall—afternoon.  
 Origin and early development of the individual; formation of stem-systems. Emphasis on the frog, chick, and pig, with reference to the human embryo. Prerequisite: Zoology 2 or the equivalent. Material fee, \$11.
- 152 *Protozoa* (3) Mortensen  
 1948-49 and alternate years: Spring, lecture (1 hour), laboratory (4 hours).  
 Introduction to the protozoa: classification, life histories, and physiology, with special emphasis on food/energy types. Prerequisite: Zoology 1. Material fee, \$8.
- 156 *Parasitology* (3) Kates  
 Lecture, lecture (1 hour), laboratory (4 hours)—evening.  
 An introduction to the study of animal parasitology, with a survey of parasite types from protozoa through arthropods. Prerequisite: Zoology 1-2 or the equivalent. Material fee, \$11.

162 *Insect Physiology* (3) Munson

1957-58 and alternate years: spring—morning.

Lectures and laboratory work on the physiology of insects. Admission by permission of the instructor. Material fee, \$11.

171-72 *Special Problems* (3-3) The Staff

Academic year—as arranged.

Written approval of the instructor is required. Material fee, \$11 a semester.

199-200 *Proseminar* (3-3) The Staff

Academic year—morning and evening.

Designed to reinforce and supplement the work of Zoology majors.

## THIRD GROUP

204 *Seminar in Invertebrate Zoology* (3) Mortensen

Spring—evening.

A study of original publications on hormones of invertebrate animals.

214 *Advanced Invertebrate Zoology* (3) Mortensen

Not offered 1957-58.

Lectures and laboratory work on problems in invertebrate physiology. Prerequisite: Zoology 1 and 101-2 or the equivalent. Material fee, \$8.

247-48 *Morphogenesis* (3-3) Hansen

1958-59 and alternate years.

Lectures and class reports on experimental morphology. Prerequisite: Zoology 41-42 or the equivalent.

251 *Seminar in Vertebrate Zoology* (3) Desmond

Fall—evening.

295-96 *Research* (arr.) The Staff

Academic year—as arranged, summer 1957—Zoology 295 (3).

Investigation of special problems.

299-300 *Thesis* (3-3) The Staff

Academic year—as arranged, summer 1957—Zoology 299 (3).





STUDENT LIFE



## STUDENT LIFE

### LIVING ACCOMMODATIONS

*Women Students.*—The Hattie M. Strong Residence Hall provides single rooms at \$38 a month and double rooms at \$44 a month a person. Meals are served at the Student Union. Admission to the University does not include dormitory reservation. A separate application for a room should be made well in advance (for the fall semester by May first, for the spring semester by January first). Forms for application, together with detailed information, may be obtained from the Director of Activities for Women.

Girls under the age of twenty-one who are enrolled for twelve or more semester hours of academic work in the University and who are not living with their parents or relatives may live outside the dormitory only with the permission and approval of the Director of Activities for Women, upon receipt of written requests from parents. In no case will permission be granted for such girls to be domiciled outside the dormitory, except with persons approved by the Director of Activities for Women.

*Men Students.*—Welling Hall provides double room facilities for 102 students. Rooms rent for \$24 a month a person. Dining facilities are available to all residents. Meals are served at the Student Union. Application forms for reservations may be obtained from the Director of Activities for Men.

Information concerning private rooming and boarding facilities near the University for women students twenty-one years of age or older and for men students may be obtained at the Housing Office, Lisner Auditorium, 730 Twenty-first Street NW. The reservation of rooms in private houses must be made by students.

### STUDENT UNION

The Student Union, 2125 G Street NW., is the center for student life. From the cafeteria on the first floor to the reading room on the fourth floor, it is well planned to meet the students' need for meals, study, recreation, and activities. In addition to the recreation lounge and social lounge the Student Union provides office space for the Student Council and for the other major student organizations.

The Student Activities Office, also in the Student Union, has available information concerning the student organizations and campus events.

## HEALTH SERVICES

For details concerning the health service program of the University, see "Health Administration", pages 213-14.

## RELIGIOUS LIFE

The University recognizes the contribution that religion can make to the education of its students by encouraging them to participate in denominational clubs of their own choice. National Catholic, Jewish, and Protestant bodies sponsor these religious organizations, which act as links between the University and the local churches. The Director of the University Chapel and the advisers to the various denominational organizations are available throughout the year for consultation on personal problems.

## UNIVERSITY CHAPEL

The University Chapel is maintained as a non-sectarian expression of the faith of the University in the contribution that religion can make to the education of its students. Twenty minute services are held Wednesday of each week at 12:10 P.M. Representative clergymen of Washington are guest speakers at these non-denominational services.

## THE PLACEMENT OFFICE

The Placement Office, 2114 G Street NW., provides assistance to students and alumni seeking full-time or part-time, temporary or permanent employment. The Office maintains a registry of positions available in many fields, both locally and nationally, and refers qualified applicants for consideration.

Students and alumni interested in placement are asked to register in person at the Office and to select from written descriptions of current openings positions for which they wish referral. Those interested in planning careers are invited to study the information on career fields and the brochures of business and industrial organizations, government agencies, etc., which are on display in advance of campus visits by recruiting officers. The services of the Counseling Center (see pages 217-18) are available to students and alumni wishing career guidance.

The Placement Office is open from 9:00 A.M. to 5:00 P.M. Monday through Friday. Interviews for referral are held from 9:00 A.M. to 2:00 P.M.

## INTERNATIONAL HOUSE

The International House, 2116 G Street NW., is the social center for students from foreign countries. A series of teas, dances, and other



forms of entertainment, and the use of club rooms and lounge enable students to become acquainted and feel at home in the University.

The International Students' Society welcomes as members students from other lands as well as North American students.

The Adviser to Students from Foreign Countries, whose office is in International House, is available for advice and guidance.

#### STUDENT ACTIVITIES

The University offers a comprehensive program of Student Activities planned to provide a variety of social and recreational experiences which complement the academic offerings.

#### DIRECTORS OF STUDENT ACTIVITIES

The University maintains the offices of the Director of Activities for Men and the Director of Activities for Women, for the guidance of students in all nonacademic phases of student life, such as student activities, social life, and housing. The directors are available for individual counseling concerning personal adjustment to university life.

#### STUDENT GOVERNMENT

##### Student Council

The University believes in developing the civic responsibilities of its students by delegating to them such authority in student activities as is consistent with established policy and regulations. To this end, the organization of the University includes the Student Council, which, under the guidance of the Directors of Student Activities, is responsible for the conduct of all student activities. The Student Council is elected annually by the student body.

##### Committee on Student Life

The Committee on Student Life is the judicial branch of the student government. It is composed of not more than seven members of the faculty, two of whom are the Director of Activities for Men and the Director of Activities for Women, appointed by the President of the University, and the following members: President of the Student Council, an Editor of the *Hatchet*, President of Mortar Board, President of Omicron Delta Kappa, President of the Inter-fraternity Council, and President of Panhellenic Council. This Committee has the power to review the acts of all student organizations, including the Student Coun-

cil, and set aside acts that are contrary to established policy and regulations of the University or the Committee.

*Approval of Student Organizations.*—This Committee is granted authority to approve or disapprove the establishment of any proposed organization on campus. No student club or society (except social fraternities, sororities, scholastic honor societies, religious or professional clubs or societies) organized as a branch or affiliate of a non-George Washington University organization will be recognized by the Committee on Student Life.

#### ELIGIBILITY FOR STUDENT ACTIVITIES

Any student registered in The George Washington University is eligible to participate in nonathletic student activities of the University; however, a student having a scholastic average of less than 2.00 is not eligible to be:

- 1 A member of the Dance Production groups, Glee Club, Cheerleaders, Student Council, Religious Council, Panhellenic Council, Interfraternity Council, Engineers' Council, Student Life Committee, or any publications staff.
- 2 An officer, permanent committee chairman, or member of the executive board of any activity.

The rules and policies of the Southern Conference govern participation in intercollegiate athletics.

The control and administration of all student activities are outlined in a separate bulletin called "Rules and Regulations Governing Student Activities."

#### SPORTS ACTIVITIES

The University is a member of the Southern Conference and the National Collegiate Athletic Association. Its teams participate in intercollegiate contests in football, basketball, baseball, tennis, golf, rifle, sailing, and crew.

The University maintains a complete program of intramural sports for both men and women. The Intramural Council, Women's Athletic Association, and Intersorority Athletic Board, cooperate with the departments of Physical Education in conducting this University program and the informal extra-mural sports program.

Other sports activities include the Fencing Club, Sailing Association, and Rowing Club.

## ARTS

The University offers an opportunity for interested students to participate in dance, drama, and music through the following organizations: Dance Production Groups I, II, III; University Dramatic Production Group; and University Glee Club. Each of these groups presents programs during the academic year.

With the cooperation of the Curator of Art, an annual student art exhibit is presented.

## ANNUAL EVENTS

*Colonial Program.*—The Student Council sponsors a series of ten cultural programs to which all students are invited.

*Recreation Program.*—The Student Council and the Dance Production Groups arrange dances—square, folk and social—at frequent intervals for all students.

*Homecoming.*—Scheduled about the middle of the Fall Semester, Homecoming is the primary festive period of the school year. It includes the annual Pep Rally and Variety Show, the homecoming football game, and the homecoming dance.

*The Winter Weekend.*—In true Mardi Gras spirit, this function includes a jazz concert and a masquerade ball.

*The Activities Fair.*—Early in the Spring Semester, all campus activities entertain the freshmen in the Lower Lounge of Lisner Auditorium, with exhibits and demonstrations. Here new students meet older students with similar interests.

*Career Conference.*—Under the sponsorship of the Student Council, guest speakers from many professions explore annually with students the potentialities of vocations available on graduation.

*May Day.*—This is the traditional time for the award of honors in student activities. Mortar Board and Omicron Delta Kappa announce and present their new members.

*The Colonial Cruise.*—An afternoon and evening cruise on the Potomac in the late spring. Students, alumni, and faculty picnic, dance, and engage in games and athletic contests.

## STUDENT ORGANIZATIONS

## HONOR SOCIETIES

*Phi Beta Kappa.*—A national honor society recognizing "outstanding intellectual capacity well employed" in the field of liberal arts and sciences. Senior and junior students who are candidates for the degree of Bachelor of Arts or Bachelor of Science in Columbian College (in exceptional cases, senior and junior students in other non-professional divisions



of the University) and who have shown broad cultural interests, distinguished scholarly achievement, high character, general promise, and scholarly ideals may, to a number not exceeding 15 per cent of a class, be elected to membership by the Faculty members of the Alpha Chapter of the District of Columbia.

*Sigma Xi.*—A national scientific honor society, the purpose of which is to encourage original investigation in science pure and applied. Outstanding graduate students in the sciences are eligible for full membership, and undergraduates who have shown marked ability in research may be elected to associate membership.

*Alpha Kappa Delta.*—A national sociology society.

*Alpha Lambda Delta.*—A national fraternity established to encourage and reward high scholarship and attainment, membership in which is limited to those freshman women who attain a scholastic average of at least 3.50.

*Alpha Omega Alpha.*—A national honor medical society.

*Alpha Pi Epsilon.*—A home economics fraternity.

*Arnold Air Society.*—A national Air Force ROTC society for advanced cadets.

*Artus.*—A national economic society.

*Delphi.*—An intersorority society.

*Delta Sigma Rho.*—A national forensic society.

*Gate and Key.*—An interfraternity society.

*Iota Sigma Pi.*—A national chemical society for women.

*Mortar Board.*—A national society for senior college women, stressing leadership, scholarship, and service.

*Omicron Delta Kappa.*—A national fraternity emphasizing leadership in extracurricular activities.

*Order of Scarlet.*—A service honorary society for sophomore and junior men.

*Order of the Coif.*—A national legal society, the purpose of which is to foster a spirit of careful study and to mark in a fitting manner those who have attained a high grade of scholarship. Members are elected each year from the highest 10 per cent of the graduating class of the Law School.

*Pershing Rifles.*—A national Air Force ROTC society for basic cadets.

*Phi Epsilon Phi.*—A national botany fraternity.

*Phi Eta Sigma.*—A national fraternity, established to encourage and reward high scholarship and attainment, membership in which is limited to those freshman men who attain a scholastic average of at least 3.50.

*Pi Delta Epsilon.*—A national collegiate journalism fraternity.



*Pi Gamma Mu.*—A national social-science society.

*Psi Chi.*—A national psychology fraternity.

*Rho Chi Society.*—A national pharmaceutical society.

*Sigma Alpha Eta.*—A national speech and hearing society.

*Sigma Pi Sigma.*—A national physics fraternity.

*Sigma Tau.*—A national engineering fraternity, the purpose of which is to recognize scholarship and professional attainment.

*Smith-Reed-Russell Society.*—A scholastic society in the School of Medicine. Students of the third and fourth years who maintain a scholastic average of 86 per cent are eligible for associate membership.

*Tassels.*—A service honorary society for sophomore women.

*William Beaumont Medical Society.*—A society founded with the object of encouraging and stimulating medical students in work of individual investigation.

#### PROFESSIONAL ORGANIZATIONS

Alpha Chi Sigma (chemistry), Alpha Kappa Psi (commerce and economics), Alpha Zeta Omega (pharmacy), American Institute of Electrical Engineers—Institute of Radio Engineers (student chapter), American Pharmaceutical Association (student branch), American Society of Civil Engineers (student chapter), American Society of Mechanical Engineers (student chapter), Delta Phi Epsilon (foreign service), Delta Theta Phi (law), Future Teachers of America, Kappa Beta Pi (law), Kappa Psi (pharmacy), Nu Sigma Nu (medicine), Phi Alpha Delta (law), Phi Chi (medicine), Phi Delta Delta (law), Phi Delta Epsilon (medicine), Phi Delta Gamma (graduate), Phi Delta Kappa (education), Phi Delta Phi (law), Pi Lambda Theta (education), Society for the Advancement of Management (student chapter), Theta Tau (engineering).

#### SOCIAL FRATERNITIES

Sigma Chi, Kappa Sigma, Phi Sigma Kappa, Sigma Alpha Epsilon, Sigma Phi Epsilon, Phi Alpha, Sigma Nu, Aoncia, Tau Kappa Epsilon, Pi Kappa Alpha, Tau Epsilon Phi, Alpha Epsilon Pi, Delta Tau Delta, Kappa Alpha.

#### SOCIAL SORORITIES

Pi Beta Phi, Chi Omega, Sigma Kappa, Alpha Delta Pi, Delta Zeta, Kappa Delta, Phi Sigma Sigma, Zeta Tau Alpha, Kappa Kappa Gamma, Delta Gamma, Kappa Alpha Theta.

## DEPARTMENTAL CLUBS

Art Club; Case Club; Chemistry Club; El Club Español; Engineers' Council; Enosian Debating Society; Home Economics Club; Howard E. Kane—A.F.A. King Obstetrical Society; Le Cercle Français; Lester F. Ward Sociological Society; Pharmacy Council; Phi Sigma Rho (philosophy); Schoentfeld Verein; Student Bar Association; Charles Clinton Swisher History Club.

## RELIGIOUS ORGANIZATIONS

Baptist Student Union, B'nai B'rith Hillel Foundation, Canterbury Club, Christian Science Organization, Lutheran Student Association, Newman Club, Religious Council, Student Christian Fellowship, Wesley Club, Westminster Foundation.

## STUDENT PUBLICATIONS

*Amicus Curiae* (Law School publication), *The Cherry Tree* (the annual), *The University Hatchet* (weekly newspaper), *The George Washington Law Review*, *Mechelen* (engineers' publication), *The Percolator* (pharmaceutical publication).

## OTHER ORGANIZATIONS

Alpha Theta Nu (scholarship winners), Big Sisters, Cheerleaders, Colonial Boosters, Current Events Club, Flying Sponsors, Interfraternity Council, Interfraternity Pledge Council, Inter-law Fraternity Council, International Relations Club, International Students' Society, Junior Panhellenic Association, Old Men, Senior Panhellenic Association, Strong Hall Council, Student Council, Student Legal Aid Society, Wandering Greeks.

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SUMMER TERM 1956

FALL AND SPRING SEMESTERS 1956-57



## DEGREES CONFERRED

## JUNIOR COLLEGE

## ASSOCIATE IN ARTS

OCTOBER 20, 1956

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Paul De Weyer	Y	John Brown	Y
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Arvo Gary Rubin	N	John W. Brown	Y
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John Allen Russell	Y	James Brown	Y
William Glen Russell	Y	John Brown	M
Franklin Warner Lee	Y	Frank Brown	Y
Samuel S. Ryerson	Y	James Brown	Y
Alvin S. Ryerson	Y	Frank Brown	Y
Charles Ann Ryerson	Y	John Brown	Y
Richard Ryerson	Y	John Brown	Y
George Thomas Smith	Y	James Brown	Y
James Smith	Y	William Brown	Y
Edward George Spaulding	Y	John Brown	Y
John James Spaulding	Y	William Brown	Y

## FEBRUARY 22, 1957

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Rebecca Robert Knicker	D.C.	Isabel Peltand Jones	D.C.
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Charles Chester Knicker	D.C.	Isabel Peltand Jones	D.C.
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Diane Fae Knicker	D.C.	Isabel Peltand Jones	D.C.
Charles Andrew Knicker	N.Y.	Isabel Peltand Jones	D.C.
James Vincent Knicker	Pa.	Isabel Peltand Jones	D.C.
Adrian Knicker	Pa.	Isabel Peltand Jones	D.C.
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Laraine Wings Knicker	N.C.	Isabel Peltand Jones	D.C.
Melvin Alton Knicker	Me.	Isabel Peltand Jones	D.C.
(With dissection)		Isabel Peltand Jones	D.C.
George Robert Knicker	Me.	Isabel Peltand Jones	D.C.
Rosemary Knicker	D.C.	Isabel Peltand Jones	D.C.
Agnes Clara Knicker	D.C.	Isabel Peltand Jones	D.C.
(With dissection)		Isabel Peltand Jones	D.C.
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Thomas Michael Knicker	Va.	Isabel Peltand Jones	D.C.

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James James Tolan	N.Y.	John Thomas White	D.C.
James Earl Tupperhill	Md.	William Wendell White	Va.
Robert Lee Tyndall	N.Y.	Michael Joseph White	Id.
Alberta Wilma Valenzuela	Mexico	Robert Martin White	Md.
(Widow's consent)		(Widow's consent)	
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OCTOBER 20, 1956

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Thomas Earl	D.C.	John Joseph Baumgardner	D.C.
John Lawrence Smith Baumbach	Md.	Marion Lee Miller	N.Y.
Michael Ann Baker	N.Y.	Marion Philip Friedman	Netherlands
Robert Ellis Clark	Md.	John William Brown	Va.
William Lawrence Carpenter, Jr.	Ohio	Thomas John Brown	Wash.
(Widow's consent—Special honors in		Carlotta Friedman	D.C.
Psychology)		James Raymond Brown	D.C.
Robert R. Baskin	Wash.	John Henry Brown	Md.
Henry Morrison Baskin	Conn.	(Widow's consent)	
Albert Lawrence Baskin	Md.	Robert Henry Brown	Md.
Lawrence Lawrence Baskin	Conn.	John Allen Brown	N.Y.
Charles Ross Baskin	Id.	Barbara Jean Smith	Calif.
James Earl Baskin	Kans.	John Lee Brown	Calif.
James Earl Baskin	Conn.	Kathleen Virginia Swanson	Md.
Anna Marie Baskin	Conn.	Patricia Ann Tamm	Va.
Rebecca Susan Baskin	N.J.	Thomas L. C. Vail	Va.
Robert Anne Baskin	Md.	John Russell Waller	N.H.
John Arthur Baskin	Md.	John Lee Wendling	Calif.
James Earl Baskin	D.C.	Thomas Lawrence White	Wash.
John John Baskin	N.Y.	Thomas Thomas White	Md.
Constance Ann Baskin		Thomas Frederick Wyatt	

FEBRUARY 22, 1957

Blair McCracken Albano	Md.	Stanley Martin Kline	D.C.
John Nelson Allen	Md.	Josephine Louise Kline	D.C.
John Lawrence Barrett	Md.	Kathleen Thomas Liska	Calif.
Charles Henry Barrett	D.C.	Robert Eugene Liska	Md.
John Lawrence Barrett III	N.D.	John Lee Liska	D.C.
Sebastian George Barrett	D.C.	Philip David Liska	Md.
(Widow's consent—Special honors in		Robert Eugene Liska	D.C.
Psychology)		Donald Thomas Liska	D.C.
Anthony Nicholas Chatter	Pa.	Samuel Arthur Liska, Jr.	Wash.
James Earl Chatter	Md.	Robert Eugene Liska	Va.
Carl Lawrence Chatter	Va.	William Ross Liska	N.J.
Henry Chatter	Pa.	John Michael Liska	Pa.
John Lawrence Chatter	D.C.	Earl James Liska	Va.
John Lawrence Chatter	Md.	Charles Arthur Liska	Va.
George William Chatter	N.Y.	Thomas Liska	Pa.
Stephen John Chatter	Conn.	William Ross Liska	D.C.
Humphrey Thomas Chatter, Jr.	Va.	Michael John Liska	Pa.
Anna Ray			



Hursey Richard Schiffman	Miss	William Vernon Van Fleet	D.C.
Randa J. Shumaker, Jr.	Va.	(With distinction)	
Frank White Smith	Md.	Margaret Wagoner	Va.
Maryella Louise Steines	Mo.	Margaret Ruth White	D.C.
Jon Edward Updyke	D.C.	Joan Kay Woods	D.C.
Nicolas Gonzalez Valderama	Philippines	(With distinction)	

## JUNE 5, 1957

Irene Martin Adams	Va.	Joyce Marie Gray	D.C.
Beverly Jane Alexander	D.C.	(With distinction)	
Lemore Sue Alexander	Va.	David Edwin Greenberg	D.C.
(With distinction)		James William Greenfield	N.Y.
Wade Sterling Algee	Calif.	Charles William Levenshch	D.C.
James Edward Armstrong	Va.	Marian Goulden Levensch	D.C.
(I. R. 1955, University of Miami)		Thomas M. Hoad, Jr.	N.J.
Anne Corbelle Baggett	D.C.	Barbara Elizabeth Hanson	D.C.
Berila James Bailey	Va.	Harold Stanley Harwood, Jr.	Va.
Arden Baker	D.C.	Tom Marie Hoffman	Md.
Joanna James Ball	Md.	Charles Martin Herberich	Md.
Donald Frederick Barnes	D.C.	Christopher Sue Heston	D.C.
John Patrick Barry	Mo.	Donald Edward Hubbs	N.M.
Alpha Layton Bastam	Va.	Bonnie Ann Huggins	N.M.
Deanna Bas	D.C.	(With distinction—Special honors)	
Joan Franklin Beaman	D.C.	(in English)	
Jeanette Sontag Bernstein	D.C.	Ruth Louise Borenstein	D.C.
Leah Lyle Bice	Ind.	(General honors in Dramatic Art)	
Francis Fenne Blacker	D.C.	William Eric Bowman, Jr.	Md.
(With distinction)		Ruth Elizabeth Burkard	Va.
Francis Edward Blake	Md.	James Earl Dugan	Mo.
(With distinction)		Mary Anne Wall	Va.
Fredrick John Blatch, Jr.	Va.	Robert Arthur J. J. J. J. J.	Va.
Sandra Ann Bow	Calif.	Thomas Page Johnson	Ind.
Beverly Elizabeth Bowden	Calif.	Frank Eugene Jones, Jr.	Md.
(General honors in Dramatic Art)		Donald Jones	Ind.
John George Kelly	Va.	Mervyn Victor Jones	Va.
Stephen Proctor Buchanan	D.C.	(With distinction)	
Joan Maryann Bueh	Philippines	Nancy Eugene Jones	Va.
Donald Campbell Bunker	Va.	Robert Neal Kasper	D.C.
Myrtle Sally Butler	Va.	Charles Edward Kestack	D.C.
Dorothy Ann Byers	Va.	Harold William Kestack	D.C.
Michael Edward Byers	D.C.	Charles McMillan King	D.C.
William Ronald Byers	D.C.	Paul Jones Kestack	D.C.
John Vincent Canfield	D.C.	Archie Franklin Kestack	Ind.
Anna Lynn Capps	D.C.	Robert Hark Lanning	Md.
Walter Clyde Clark, Jr.	D.C.	(With distinction)	
Richard Allen Clark	Calif.	Bertha Alvada Lee	Ind.
Allen Barry Clark	D.C.	Yvonne Evelyn Lee	Ind.
Allen George Clark III	Calif.	Frank Frank Lee	D.C.
Paul David Clark	D.C.	Marie Virginia Lee	D.C.
Edward Gerald Chapman	D.C.	Anna E. Lee	Va.
Allen Agnes Clark	N.Y.	Charles Lee Lee	D.C.
Gordon Lee Clark	Ind.	William Lee Lee	D.C.
(With distinction—Special honors)		Robert James Lee	D.C.
(in English)		Emily Miller Marshall	Va.
Edward Ralph Cline	D.C.	(General honors in Speech)	
David Eugene Cline	Fla.	William Arthur Medina	N.Y.
(General honors in Speech)		Robert Medina	D.C.
Charles Allen Cline	Md.	Robert Medina Miller	Va.
John Robert Cline, Jr.	D.C.	Margaret W. Miller	Md.
(With distinction)		Thomas G. Miller	Va.
James Margaret Cline	D.C.	Lucille Virginia Monahan	Va.
Louise Frank Cline	Md.	Joan Page Nichols	Va.
William Cline	Md.	(With distinction)	
Ernest M. Cline	Md.	John Raymond Page	N.J.
Charles George Cline, Jr.	D.C.	Frank Ralph Page	Ind.
Charles Ernest Cline	Va.	Elizabeth E. Page	Ind.
John Cline	Md.	Edward Lee Page	Ind.
Edward Cline	D.C.	Ann Marion Pearson	D.C.
Edward Cline	D.C.		
Harold Allen Galtman	Va.		
Thomas Anne Galtman	D.C.		



Arthur Jay Perkin	D.C.	Mary Sandra Slomemaker	M.D.
Catherine A. P. Pletten	D.C.	(With Student Fee)	
Harold L. Pomeroy	A.	Russell Joseph Stedie	N.J.
Robert P. P. Pomeroy	M.D.	James Louis Stiles	Va.
Gregory A. Pomeroy	D.C.	Frederick Louis Stiles	D.C.
(With Student Fee)		Clayton Franklin Smith, Jr.	Pa.
John M. P. Pomeroy	Va.	Elizabeth Hope Smith	Pa.
John H. Pomeroy	N.Y.	John Smith Thayer, Jr.	D.C.
Walter M. Pomeroy	D.C.	Marion Paul Thompson	M.D.
John H. Pomeroy	M.D.	Clara Harmon Thorne, Jr.	Va.
Walter G. Pomeroy	Va.	(With Student Fee) Special Honors	
Robert A. Pomeroy	N.J.	(In General)	
Arthur L. Pomeroy	D.C.	Robert Jay Tracy	M.D.
John H. Pomeroy	D.C.	Robert A. Tracy	D.C.
John H. Pomeroy	D.C.	Allen Tracy Thompson	M.D.
John H. Pomeroy	Va.	Frank John Waters	M.D.
John H. Pomeroy	Va.	Virginia Caroline Wilson	Pa.
John H. Pomeroy	D.C.	(With Student Fee) Special Honors	
(With Student Fee)		(In General)	
Donald H. Pomeroy	N.Y.	Lawrence W. Wolf	D.C.
John H. Pomeroy	Va.	William Richard Wolfe, Jr.	M.D.
		David Joseph Wynn	M.D.
		Charles Edward Young	Va.

## BACHELOR OF SCIENCE

(OCTOBER 20, 1950)

NY Letter to Legat Havana

FEBRUARY 22, 1957

Clair Mather Loughmiller, Sr.	MA.	Pharm. Louis Treceus	V.
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JUNE 5, 1957

[illegible]

## MASTER OF ARTS

OCTOBER 20, 1956

EXHIBIT 20 1980					
Author	Book	Year	Editor	Book	Year
A. J. Auer	The George Washington	N. Y.	Robert M. Jensen	The George Washington	N. Y.
L. A. Auer	The George Washington	N. Y.	Robert M. Jensen	The George Washington	N. Y.
L. A. Auer	The George Washington	N. Y.	Robert M. Jensen	The George Washington	N. Y.
L. A. Auer	The George Washington	N. Y.	Robert M. Jensen	The George Washington	N. Y.

Robert Harvey Kane	N Y	Marye Robins	Va
B.B.A. 1943, College of the City of New York		A.B. 1947, College of William and Mary	
Walter Louis Kling	Germany	A.M. 1949, University of Chicago	Ph
B.S. 1934, Chesham University		A.B. 1949, Brown University	
Martha Ruth Livingston	Pa	Ph.D. 1951, Harvard University	N Y
A.B. 1948, Williams College		A.B. 1948, Cornell University	
Grace Frances Ostrom	Am	Award degree, Wales	N I
A.B. 1944, The George Washington University		A.B. 1944, The George Washington University	

## FEBRUARY 22, 1957

James Kenneth Adams	Calif	Enrico Louis Lerner	Md
A.B. 1949, University of California at Los Angeles		A.B. 1941, The George Washington University	
Vivian Pauline Bakeman	Calif	Robert Clinton Rutledge	Va
B.S. 1949, U. S. Coast Guard Academy		A.B. 1949, University of Virginia	
John Gavin Burke	Va	Boyd Lee Smith	D.C.
A.B. 1949, The George Washington University		A.B. 1944, The George Washington University	
Raymond Farns	Fla	John Leslie Stewart	Fla
A.B. 1949, The George Washington University		A.B. 1949, The George Washington University	
Alexander Ramsey Gendron	Pa	Raymond Frank Thomas	D.C.
A.B. 1949, University of Virginia		A.B. 1949, The George Washington University	
Walter Harold Hume, Jr.	Vt	Boris Harold Raymond Wolf	D.C.
A.B. 1948, University of Vermont		A.B. 1948, The George Washington University	
Stephen Abraham Laitman	N Y		
A.B. 1944, The George Washington University			

## JUNE 5, 1957

Donald Stanley Black	Fla	Maria Jeannette LaChapelle	Kent
A.B. 1949, New York University		A.B. 1947, The George Washington University	
John Bonker	D.C.	Harve Hirsch Neuman	D.C.
A.B. 1949, Roosevelt College		A.B. 1949, Johns Hopkins University	
John Grant Burke	Va	Vincent Francis Norton	D.C.
A.B. 1949, The George Washington University		A.B. 1949, University of Missouri	
Anthony Chan	Venezuela	Leonard Arnold Rapoport	N.C.
A.B. 1949, The George Washington University		A.B. 1949, University of North Carolina	
Stanley Elmer Cramer	Va	LaVerne Helen Robinson	Calif
A.B. 1949, Pennsylvania State University		A.B. 1949, The George Washington University	
Edward Philip Davies	Md	George William Rowe	Ind
A.B. 1944, The George Washington University		A.B. 1949, Vanderbilt University	
Mark Lawrence Gendron	D.C.	George Ernest van der Meer	Md
A.B. 1949, Johns Hopkins University		A.B. 1949, Johns Hopkins University	
Robert David Ginn	N Y	Thomas Gale van Tassell	D.C.
A.B. 1949, Columbia University		A.B. 1949, The George Washington University	
Hilda Ray Harris	Va	Enola Jeanne Wall	Tenn
A.B. 1949, The George Washington University		A.B. 1949, Southern Methodist University	
Mary Ellen Hastings	Mass	Mary Helen Westwood	D.C.
A.B. 1949, Smith College		A.B. 1949, The George Washington University	
Stephen Barker, Jr.	Calif	Russell McKay White	Vt
B.S. 1951, U. S. Naval Academy		B.S. 1951, Amherst College	

## MASTER OF SCIENCE

## OCTOBER 20, 1956

Robert Evans Harizan	D.C.	Calvin Melvin Morris	Md
B.S. 1947, American University		A.B. 1949, Johns Hopkins University	
Mary Elton	Vt	Arthur Jack Rife	Fla
B.S. 1949, The George Washington University		B.S. 1949, The George Washington University	
Alan C. Lutz	Md		
B.S. 1952, University of Maryland			

## FEBRUARY 22, 1957

Joseph Albert Cantano	N.Y.	Howard R. Roberts	N.Y.
B.S. 1951, Brooklyn Polytechnic Institute		B.S. 1951, The George Washington University	
A.M. 1953, Princeton University			
Jack Lewis Hays	MI	Arthur Lee Smith	MI
B.S. 1955, Ohio State College		B.S. 1955, The George Washington University	
Ronald G. K. Rabin	D.C.		
B.S. 1958, New York College			

## JUNE 5, 1957

1969, Roger Hornsby and A. L. 1969, University of Vermont	Va	Vance, Edward J. 1969, The George Washington University	U.C.
1969, Thomas Hornsby D.S. 1969, University of Vermont	I.C.	Waller, Marion Spence A. L. 1969, University of California at San Diego	Va
1969, William Hornsby D.S. 1969, University of Tennessee	Md	M. J. Anderson D.S. 1969, The George Washington University	U.C.
1969, Robert Hornsby A. L. 1969, University of Vermont	U.C.	B. J. Anderson, Vassar D.S. 1969, Pennsylvania University	Md
1969, John Hornsby D.S. 1969, University of Maryland	U.C.	R. J. Anderson D.S. 1969, The George Washington University	I.C.
1969, John Hornsby D.S. 1969, University of Maryland	Md		

THE SCHOOL OF MEDICINE

## DOCTOR OF MEDICINE

JUNE 5, 1957

Middle College, Albany		Robert William Higgins	Indiana
A.B. 1911, Williams College	Connecticut	B.S. 1914, Union State University	
Business College, Albany		Sumner Day	Connecticut
A.B. 1911, Union State College	California	B.S. 1911, M.S. 1913, The College	
Williams College, Albany	California	Washington, Missouri	
A.B. 1911, Williams College		Leporello Williams, Ohio	California
Williams College, Albany	California	A.B. 1911, Stanford University	
A.B. 1911, University of California		Van Lyle, California	D.C.
John A. A. A.		Charles Reid, Ohio	Massachusetts
A.B. 1911, The George Washington	Virginia	B.S. 1911, University of Maryland	
University		Leah, Maryland, Connecticut	California
Verona, Illinois		A.B. 1911, University of California	
A.B. 1911, University of California	D.C.	Maryland, New York	California
University		Donald, Washington	D.C.
A.B. 1911, The George Washington		A.B. 1911, Mount Union College	
University		Robert, Ohio, Ohio	Massachusetts
George Washington, Boston, Jr.	California	B.S. 1911, The George Washington	
(W. A. Williams)		University	
Robert, New York	Massachusetts	James, New York	New York
B.S. 1911, University of Maryland		James, Ohio, Ohio	Indiana
James, New York, Jr.	California	B.S. 1911, Indiana University	
James, New York	New York	Charles, Ohio, Ohio	Utah
B.S. 1911, Indiana College		B.S. 1911, University of Utah	
Stacy, New York	New York	Edna, Idaho, Idaho	Idaho
A.B. 1911, New York University		B.S. 1911, Idaho State College	
Norfolk, New York	D.C.	Low, Ohio, Ohio	Pennsylvania
George, New York		B.S. 1911, Franklin and Marshall	
George, New York	Virginia	College	
B.S. 1911, Franklin and Marshall College		Henry, Karl, Indiana, Jr.	California
Stacy, New York	Pennsylvania	B.S. 1911, University of Maryland	
A.B. 1911, The George Washington	Pennsylvania	Robert, Ohio, Ohio	Utah
University		William, Ohio, Ohio	California
Day, New York	Virginia	John, Ohio, Ohio	D.C.
A.B. 1911, Center College		With, Washington	
		B.S. 1911, Mount Union	



George Benjamin Lora	D.C.	John E. Lough, M.N.J.	Va.
B.S. 1916, Miami University		(With dissertation)	
David Thomas Loran	Calif.	A.B. 1920, University of Miami	
B.S. 1921, Brigham Young University		William L. Lupton, Missouri	N.Y.
Oswald Wright Loring	Mo.	A.B. 1912, University of Virginia	
(With dissertation)		Edw. C. Lutz, Miami	Mo.
A.B. 1911, Sweet Home College		A.B. 1919, York College, University	
M.S. 1911, The George Washington		Arthur Lutz, Missouri	D.C.
University		A.B. 1918, A.M. 1922, University of	
Markus Albert Duffy	D.C.	Iowa	
A.B. 1911, Dartmouth College		M.O. 1911, University of Michigan	Pa.
1912, Yale	N.Y.	E. C. Lutz, University of North	
A.B. 1911, New York University		A.B. 1914, The George Washington	
James Edmund Lusk, Jr.	N.Y.	University	
Bachelor's Degree	D.C.	Charles William Lutz	Iowa
A.B. 1914, The George Washington		A.B. 1911, Ohio State College	
University		Robert Earl Lutz	N.M.
Sigurd Jacob Lyba	Iowa	(With dissertation)	
B.S. 1911, West Virginia University		Lawrence Conrad Lutz	N.Y.
Maria Lyba	N.J.	B.S. 1911, The George Washington	
(With dissertation)		University	
Anna Thelma Lyba	Ill. R.	Lawrence Lutz, Pa.	N.Y.
B.S. 1911, Georgetown University		A.B. 1911, Harvard University	
Edward Lutz, Ph.D.	Mo.	Samuel Lutz, University of Minnesota	Gene.
(With dissertation)		B.S. 1911, Wisconsin Methodist Lutheran	
A.B. 1911, University of North Carolina		College	
A.M. 1911, University of Texas		A.M. 1911, Ph.D. 1911, The George	
William Lutz, Indiana	Ind.	Washington University	
B.S. 1911, Indiana State College, Terre		Robert Louis Raymond	Iowa
Marion Ronald Lutz	D.C.	B.S. 1911, University of Scranton	
A.B. 1911, Hamilton State College		Robert Earl Raymond	Mo.
Edward Harry Lutz	Ill.	(With dissertation)	
B.S. 1911, Wisconsin College		B.S. 1911, American University	
James Harrison Lutz	D.C.	George Henry Reynolds	I. I.
A.B. 1911, Duke University		(With dissertation)	
William Edwin Lutz	D.C.	B.S. 1911, The George Washington	
A.B. 1911, The George Washington		University	
University		Ronald Lutz, Pa.	Mo.
John Thomas Lutz	N.J.	B.S. 1911, University of Maryland	
B.S. 1911, Philadelphia College of		Patrick Lutz	Iowa
Commerce and Finance		A.B. 1911, Temple University	
Wayne Burton Lutz	Ind.	M.A. 1911, University of Connecticut	
A.B. 1911, Brigham Young University		James Earl Lutz, Jr.	Calif.
Maria Anna Lutz	N.Y.	Lutz, Elizabeth Weyrich, Jr.	Mo.
A.B. 1911, College of New Rochelle		A.B. 1911, The George Washington	
Kenneth Henry Lutz	Wa.	University	
A.B. 1911, Central College		George Edward Weyrich	Ill.
Charles Hylton Lutz	Calif.	A.B. 1911, The George Washington	
Washington State	D.C.	University	
B.S. 1911, American University		Donald Wally Weyrich	D.C.
Walter Lutz, Pa.	Pa.	(With dissertation)	
B.S. 1911, Duquesne City College		A.B. 1911, University of Illinois	
Edward Blaine Lutz	Ill.	Lutz, David Weyrich	Ill.
A.B. 1911, University of Texas		B.S. 1911, Lawrence College	
M.S. 1911, University of Illinois		Ronald Wally Weyrich, Jr.	Va.
Roger Lutz	N.Y.	(With dissertation)	
A.B. 1911, New York University		A.B. 1911, The George Washington	
Stanley Martin Lutz	D.C.	University	
A.B. 1911, The George Washington		Joseph Perry Lutz	Pa.
University		(With dissertation)	
Victor D. Lutz	Iowa	B.S. 1911, University of Edinburgh	
B.S. 1911, University of Idaho		Robert Lloyd Lutz	Mo.
Maria Anna Lutz	Calif.	B.S. 1911, Montana Valley College	
A.B. 1911, Pacific Union College		Robert Charles Lutz	Wa.
Henry Edmund McCarthy	Mo.	P.E. 1911, The George Washington	
A.B. 1911, University of Texas		University	
A.M. 1911, The George Washington		Nicholas Lewis Zimm	D.C.
University		B.S. 1911, Georgetown University	
James Samuel McNeil	W.V.		
A.B. 1911, West Virginia University			



## THE LAW SCHOOL

## BACHELOR OF LAWS

OCTOBER 20, 1956

Thomas Milton Anderson, Jr. A.B. 1931, Princeton College	ME	James Joseph Murphy, Jr. B.S., U.S.A., 1947, Northwestern University	Mass.
John Thomas Anderson, Jr. B.S. 1931, University of Maryland	MD	Jack Henry Newman A.B. 1936, Ohio State University	Mo.
Nathan Lane B.F. 1931, New York University	MD	Alvin M. Lutz Perry A.B. 1937, The College	Va.
Benjamin William Peterson, Jr. B.S. 1931, University of Illinois	Mo.	Ida William Phelan B.S., M.P.H., University of Trent Hamilton	N.H.
William R. Rabinowitz A.B. 1931, William M. Lawrence College	Mass.	Robert Lawrence Shultz A.B. 1931, University College	MD
John Paul Parvizi B.S. 1931, Western Reserve University	Conn.	Mary Thelma Johnson A.B. 1931, Ohio University	Nev.
Charles James Pickett A.B. 1931, West Virginia University	W.V.	Maxine Francis Ruppel A.B. 1931, St. Joseph's College	N.H.
Paul Lee Phipps A.B. 1931, University of Virginia	Pa.	James Taylor R. Smith B.S. 1931, University of Michigan	Va.
Edward Charles Phipps A.B. 1931, St. Mary's College, College	Conn.	Ernest Henry Rouse B.S. 1931, Yale University	Mo.
Michael Joseph Phipps B.S. 1931, Princeton University	Mass.	Ernest Paul Smith A.B. 1931, Columbia University	N.Y.
George Lee Phipps B.S. 1931, Princeton University	Va.	Helen Smith A.B. 1931, The George Washington University	Ill.
James Edward Phipps B.S. 1931, Princeton University	N.Y.	David William Spurgeon B.S. 1931, Princeton University	Pa.
Ida Phipps B.S. 1931, Princeton University	Mo.	James Joseph Smith B.S. 1931, Indiana College	Mo.
Charles Phipps B.S. 1931, Princeton University	Conn.	Robert Allen Smith B.M. 1931, Ohio State University	Ill.
John Phipps B.S. 1931, Princeton University	Ky.	Clark Perry Swann B.M. 1931, German Agricultural College	Mo.
William A. Phipps A.B. 1931, University of Texas	Tex.	Marion Williams, Jr. A.B. 1931, The George Washington University	Ind.
Michael Phipps B.S. 1931, University of Texas	Nev.	Arthur Richard White B.A., M.P.H., 1941, Northwestern University	Mass.
Robert W. Phipps B.S. 1931, Princeton University	Kent.		
Ida Phipps B.S. 1931, Princeton University	Mo.		

FEBRUARY 22, 1957

Harvey Hyatt Blair B.S. 1931, University of Alabama	MD	Edward Joseph Thiele B.S. 1931, University of Washington	MD
John P. Blair B.S. 1931, University of Alabama	Ky.	George Michael Thiele A.B. 1931, The George Washington University	Wash.
Arthur M. Blair B.S. 1931, University of Alabama	Mo.	Benjamin David Thiele B.S. 1931, University of Alabama	Conn.
James Blair B.S. 1931, University of Alabama	N.H.	Alexander Raymond Thiele B.S. 1931, University of Michigan	Va.
Ida Blair B.S. 1931, University of Alabama	S.D.	Francis Xavier Thiele, Jr. A.B. 1931, The George Washington University	MD
Paul Blair A.B. 1931, Lake Forest College	Vt.	Lloyd M. Thiele B.S. 1931, Brigham Young University	Utah
Robert Blair B.S. 1931, University of Alabama	Mo.	John William Thiele, Jr. B.S. 1931, University of Iowa	Ind.
Ida Blair B.S. 1931, University of Alabama	Vt.	James Francis Thiele, Jr. B.S. 1931, College of the Holy Cross	Ill.
George Blair B.S. 1931, University of Alabama	Vt.	John Richard Thiele B.S. 1931, University of Minnesota	Mass.

Merrill Donaldson Knight III A.B. 1911, The George Washington University	Va.	Pauline Bernice Neumeyer A.B. 1911, The George Washington University	Va.
Donald Hook Chou Lou A.B. 1911, Yale University	Hawai	Joseph P. O'Neil B.A. 1911, Mount Union College	Va.
Jack Mackin A.B. 1911, The George Washington University	D.C.	Michael E. Rogers B.S. 1911, Columbia University	Ind.
Earle Rufus Marden, Jr. B.S. in M.E. 1911, University of Maryland	MI	William Gordon Tappin B.S. 1911, University of Massachusetts	D.C.
Ray Jerome Mason A.B. 1911, Mexico City College	N.Y.	Samuel Peter Tolson B.S. 1911, Purdue University	N.Y.
William Edmund Mather A.B. 1911, Dartmouth College	D.C.	James Arthur Thompson B.S. 1911, Princeton University	Pa.
Emil Joseph Meyer B.S. in Ed. 1911, Villanova College	N.J.	Isaac Russell Thorne A.B. 1911, Wake Forest College	Va.
Ronald Gerard Morgan A.B. 1911, Villanova College	Conn.	Daniel Gilbert Winkler A.B. 1911, University of North Carolina	D.C.
Wallace Henry Morgan A.B. 1911, University of Florida	Fla.	Thomas William Young A.B. 1911, Wake Forest College	D.C.
Charles Leroy Mouton B.S. in Ch.E. 1911, University of Missouri and Minnesota	Va.	Robert George Wray B.S. in Ch.E. 1911, Northwestern University	Mass.
Robert William Munn B.S. in E. 1911, New York University	D.C.	Lawrence Wray B.S. in Ch.E. 1911, Northwestern University	ME
Richard Gary Muller B.S. 1911, New York University	W.Ya.	John F. Young B.S. in Ch.E. 1911, Northwestern University	Va.
James William Munkin II B.S. 1911, St. Joseph's College	Va.		

## JUNE 5, 1957

Carlisle John Anthony A.B. 1911, The George Washington University	Va.	Henry Sabin Jones A.B. 1911, Pennsylvania College	N.C.
Robert Kay Ayres B.S. in Ch.E. 1911, Pennsylvania State University	Ind.	Myron William DeLong A.B. 1911, University of Michigan	ME
Frank David Baker A.B. 1911, Maryland Southern College	Mass.	Frederick William Dowd A.B. 1911, University of Wyoming	Va.
William T. Baker, Jr. A.B. 1911, University of Washington	Wash.	Miss Fred Luciani B.S. in Chem. 1911, Duke College	N.J.
Vernon Richard Baker A.B. 1911, Columbia College	Mich.	Robert Allen Duff B.S. 1911, University of Texas	ME
Marion Edward Baker B.S. 1911, Pennsylvania State College, Trappe	Va.	Harold Lawrence Duffell A.B. 1911, Mount Union College	Ind.
Robert Arthur Baker A.B. 1911, University of Michigan	N.Y.	Arthur Richard Ferguson B.S. in Ch.E. 1911, University of Delaware	Ind.
Charles Eddy Baker B.S. in Ch.E. 1911, University of Maryland	ME	Robert Arthur Galt A.B. 1911, Penn College	Va.
William Bruce Baker B.S. 1911, M.S. 1911, Iowa State College	Iowa	Robert Taylor Galt A.B. 1911, University of Richmond	ME
David Stephen Baker A.B. 1911, University of Virginia	Me.	Charles Joseph Galt B.S. 1911, University of Minnesota	ME
John Jacob Baker, Jr. A.B. 1911, The George Washington University	D.C.	Harold Galt B.S. 1911, College of the City of New York	N.Y.
William Bruce Baker A.B. 1911, Yale University	Va.	Robert Taylor Galt A.B. 1911, University of Tennessee	ME
Edwin Bernick Baker A.B. 1911, Maryland University of Women	Kans.	Stanley Howard Galt B.S. 1911, University of Tennessee	ME
Frederic Franklin Baker B.S. in Ch.E. 1911, University of Virginia	Va.	Lawrence Galt A.B. 1911, The George Washington University	Wash.
James Campbell Baker B.S. 1911, University of Rhode Island	R.I.	Robert Ray Galt A.B. 1911, University of North Carolina	N.C.
Ira Arthur Baker B.S. in Ch.E. 1911, The George Washington University	Va.	Edna Marie Galt A.B. 1911, University of Arizona	D.C.
Anthony Peter De Lis II B.S. 1911, International Institute of Brooklyn	Va.	Frederick T. Galt A.B. 1911, University of Virginia	ME
		Earle Harrison Galt A.B. 1911, Washington University	Va.
		Harold Keith Galt B.S. 1911, University of Maryland	Va.

Russell C. Coston Hayward	Md	Jerry Walter Mitchell	Va
A.B. 1924, University of Maryland		B.S. 1920, U.S. Merchant Marine Academy	
M. H. Hulse	Md	Arthur C. Campbell Macanally	Pa
B.S. 1920, The George Washington University		Robert Paul Morgan	Va
Jerry Guyton Henderson	Va	B.S. 1920, Macanally College	
A.B. 1921, Dickinson University		Joseph Murray	Va
Charles Allen Hinkle	D.C.	B.S. 1920, University of Richmond	
A.B. 1924, Yale University		Clinton Lewis Mumford	Va
William Ward Johnson	Utah	A.B. 1921, Pennsylvania State University	
B.S. 1924, Brigham Young University		Thelma Louise Niles	N.Y.
William Ward Johnson	Utah	A.B. 1921, Yale University	
A.B. 1921, Idaho State College		A.M. 1926, Columbia University	
Charles Louis Johnson, Jr.	Md	James Stewart O'Brien	Ka
B.S. 1922, 1922, University of Maryland		A.B. 1922, Centre College	
Frank Faye Jones, Jr.	Texas	Thelma Niles	Pa
Harold Murray Kibbe	Va	B.S. 1921, 1921, Yonkers College	
A.B. 1921, Indiana University		M.B.A. 1922, University of Pennsylvania	
James Richard Kibbe	Va	Henry Franklin	Md
B.S. 1922, University of Maryland		B.S. 1922, 1922, Washington College	
Gordon Eugene Kibbe	Va	Michael Arthur Kiskadee	Va
A.B. 1921, Louisiana Polytechnic Institute		B.S. 1920, M.D. 1920, University of Tennessee	
Raymond Allen Kibbe	Pa	Robert L. Kiserly	Md
A.B. 1920, Lehigh Valley College		B.S. 1920, University of North Carolina	
Proctor Kibbe	D.C.	A.M. 1921, American University	
Macanally, C. H. University of Zurich, Switzerland		Russell Neil Kiserly	Md
Louise Kibbe 1918, Postgraduate Education 1922, University of Illinois, Evanston		B.S. 1922, Christian University of America	
John Edmund Kibbe	Md	Horace Kent Kiserly	Ill
B.S. 1921, University of Maryland		B.S. 1921, University of Illinois	
Carl John Kibbe, Jr.	Texas	Donna Kiserly	Ka
A.B. 1920, 1921, M.B. 1921		James Kiserly	Md
M.P. 1921, University of Missouri		B.S. 1924, University of Maryland	
George Henry Kibbe	Md	David Martin Kiserly	Md
B.S. 1920, U.S. Merchant Marine Academy		A.M. 1922, Western Maryland College	
John F. Kibbe	D.C.	Arthur Kiserly	D.C.
B.S. 1924, University of North Carolina		A.B. 1921, The George Washington University	
William Kibbe Macanally	Del	Joseph Kiserly	Md
A.B. 1920, University of Delaware		A.B. 1920, University of Michigan	
Robert Thomas Kibbe	Va	John Matthew Kiserly	Pa
B.S. 1920, M.B. 1920, Virginia Polytechnic Institute		B.S. 1920, M.E. 1920, Pennsylvania State University	
Frank Lewis Kibbe	N.Y.	Henry Kiserly	N.Y.
A.B. 1921, The George Washington University		A.B. 1920, The George Washington University	
Maxwell K. Kibbe	Ill	Nathan Kiserly Taylor	Md
B.S. 1920, Illinois University		B.S. 1921, University of Maryland	
Anna W. Kibbe	Md	John Harold Van Gordon, Jr.	N.Y.
A.B. 1920, The George Washington University		A.B. 1920, Syracuse University	
Harold Kibbe		James Mann Van Hise	N.Y.
A.B. 1921, The George Washington University		B.S. 1920, Hope College	
Robert Kibbe		Charles Edward Venable, Jr.	Md
A.B. 1921, The George Washington University		B.S. 1921, U.S. Coast Guard Academy	
Robert Louis Kibbe	Md	Frank F. Fawcett Wooten, Jr.	Md
B.S. 1921, 1921, The George Washington University		A.B. 1921, Howard College	
Robert Louis Kibbe		John William Wooten	W.Va.
B.S. 1921, 1921, The George Washington University		A.B. 1920, Howard College	

**BACHELOR OF LAWS IN NATIONAL UNIVERSITY**

**FEBRUARY 22, 1957**

Edward James Kiserly, Jr.	Va	James Oswald O'Brien	Md
Leona Kiserly, Jr.	D.C.	B.S. 1920, University of Maryland	
A.B. 1922, Macanally College		James Oscar Ruffin	Md



## JURIS DOCTOR

OCTOBER 20, 1956

Richard Louis Abken	Mo.	Daniel Eugene McNeil	Mo.
B.S. 1944, U. S. Coast Guard Academy		A.B. 1977, A.M. 1941, University of	
Donald Henry Fuller	Ill.	M. 1940	
B.S. 1941, University of		Charles Edward Mosser	Fla.
North Dakota		B.S. 1944, Georgetown University	
Joseph Martin Lane	Ohio	Russell Wayne Sullivan, Jr.	Va.
B.S. 1940, Case Institute of Technology		B.S. 1947, The George Washington	
		University	

FEBRUARY 22, 1957

Harley Earl Disher	N.Y.	George Harold Mathews	N.Y.
B.S. 1944, U. S. Coast Guard Academy		B.S. 1944, University of Maryland	
Arnold W. Sams Galtieri, Jr.	D.C.	Raymond Joseph Ralston	Va.
A.B. 1944, University of Virginia		A.B. 1949, Dartmouth College	
Carroll Lewis Gilman	S.C.	Emmett T. Smith	Calif.
A.B. 1949, A.M. 1950, University of		B.S. 1944, California Institute of	
South Carolina		Technology	
George Joseph H. Hester	S.D.	George Hubert Weller	Calif.
B.S. 1944, Virginia Military Institute		B.S. 1944, U. S. Coast Guard Academy	
William George Hunt	Va.	Raymond W. Young	N.Y.
B.S. 1949, Tulane University		A.B. 1944, New Jersey State Teacher's	
Henry Robert Lerner	N.Y.	College, Newark	
B.M.S. 1949, College of the City of		A.M. 1949, Rutgers University	
New York		B.S. 1949, Johns Hopkins University	

JUNE 5, 1957

Richard Henry Beyer	Va.	Charles Allen Meyer	Ohio
B.S. 1944, Jackson College of		A.B. 1944, Oklahoma University	
Technology		Harold Thomas Moore	Iowa
George Perrine Collier	Me.	W. J. 1944, University of Missouri	
A.B. 1944, University of California at		Russell Mark Smith, Jr.	Fla.
Los Angeles		A.B. 1944, Princeton University	
Leon Edward Davidson	D.C.	James Griffin Stinson	Me.
A.B. 1944, The George Washington		A.B. 1944, University of Georgia	
University		John Carl Proctor	Mass.
Edward Henry DeLong	D.C.	A.B. 1944, Ford College	
A.B. 1944, The George Washington		Harold Robinson	N.Y.
University		B.S. 1944, College of the City of	
Alvin Louis Black Pacific Telephone	N.Y.	New York	
A.B. 1944, Fordham University		Bernard Rubin	Ill.
William		A.P. 1944, The George Washington	
Charles Lewis Hixson	Ind.	University	
A.B. 1944, Western College		Frank Louis Wynn	Utah
St. Henry		B.S. 1944, Franklin Young University	
Thomas Henry Jones	N.Y.	Bernard Rubin	Ill.
B.S. 1944, University of the City of		A.P. 1944, University of Oklahoma	
New York		A.M. 1944, University of California	
Thomas Henry Jones	Va.	Edward Frank Wynn	Fla.
B.S. 1944, University of California		B.S. 1944, State Teacher's	
University		College, Newark	
Mary Ellen McLaughlin	Va.		
A.P. 1944, The George Washington			
University			

## MASTER OF LAWS

OCTOBER 20, 1956

Elmer Ralph Cason, Jr.	Mass.	Alfred Charles Manning	N.Y.
B.S. 1944, University of		B.S. 1944, The George Washington	
Massachusetts		University	
J. D. 1947, The George Washington		Edward Joseph Parnell	Mass.
University		B.S. 1944, Boston University	
Donald William Goodhart	N.Y.		
A.B. 1944, Cornell			
University			



FEBRUARY 22, 1957

Leone Albert J.	D.C.	University of Maryland	Va.
LL.B. 1948, The George Washington University		LL.B. 1948, University of Maryland	
Robert Franklin Conard	Va.	University of Maryland	Mass.
B.S. in Eng. 1939, LL.B. 1941, The George Washington University		A.B. 1939, LL.B. 1941, University of Maryland	
William Howard Hays	N.Y.	University of Maryland	Va.
B.C.S. 1931, LL.B. 1931, Cornell University		LL.B. 1931, The George Washington University	
Howard S. Isaac	N.Y.	University of Maryland	Mo.
A.B. 1928, LL.B. 1930, Cornell University		A.B. 1928, Cornell University	
		LL.B. 1930, University of Maryland	

JUNE 5, 1957

Alfred Howard (now) Friedman, Jr.	Va.	University of Maryland	D.C.
A.B. 1931, University of Maryland		A.B. 1931, University of Maryland	
LL.B. 1934, University of Maryland		A.M. 1937, University of Maryland	
Michael Arnold Lewis, Jr.	Mass.	LL.B. 1934, The George Washington University	
A.B. 1931, LL.B. 1933, University of Maryland		University of Maryland	
Benjamin William Coleman	Va.	University of Maryland	D.C.
B.A. 1931, U.S. Naval Academy		A.B. 1931, LL.B. 1932, New York University	
LL.B. 1934, The George Washington University		University of Maryland	
Maxwell Benjamin Friedman	N.Y.	University of Maryland	Mo.
LL.B. 1931, U.S. Naval Academy		LL.B. 1931, The George Washington University	
Robert Owen Hays	Mass.	University of Maryland	Ill.
A.B. 1930, LL.B. 1934, Washington University		LL.B. 1931, The George Washington University	
Arthur Hays	Wis.	University of Maryland	Texas
P.H.D. 1931, LL.B. 1933, University of Wisconsin		LL.B. 1931, LL.B. 1934, University of Wisconsin	
David William Isaac	Ill.	University of Maryland	Pa.
B.S. 1931, LL.B. 1934, University of Wisconsin		LL.B. 1931, LL.B. 1934, University of Wisconsin	

MASTER OF COMPARATIVE LAW

JUNE 5, 1957

Robert Howard Friedman, Jr.	Thailand	University of Maryland	D.C.
LL.B. 1934, University of Maryland		LL.B. 1934, University of Maryland	
Robert Maxwell Lewis, Jr.	Thailand	University of Maryland	
LL.B. 1934, University of Maryland		LL.B. 1934, University of Maryland	
Robert Owen Hays	Philippines	University of Maryland	
LL.B. 1934, University of Maryland		LL.B. 1934, University of Maryland	
Arthur Hays	D.C.	University of Maryland	
LL.B. 1934, University of Maryland		LL.B. 1934, University of Maryland	

MASTER OF COMPARATIVE LAW (AMERICAN PRACTICE)

OCTOBER 20, 1956

Arthur Hays Friedman	Texas	University of Maryland	Pa.
LL.B. 1934, University of Maryland		LL.B. 1934, University of Maryland	
Robert Maxwell Lewis, Jr.	Hawaii	University of Maryland	
LL.B. 1934, University of Maryland		LL.B. 1934, University of Maryland	
Robert Owen Hays		University of Maryland	
LL.B. 1934, University of Maryland		LL.B. 1934, University of Maryland	

FEBRUARY 22, 1957

Joseph Linnardi  
Lic. Jur., 1904, Royal University of  
Naples, ItalyD.C. Joseph Vytantas  
LL.B., 1908, University of Vytautas  
the Great, Lithuania

D.C.

JUNE 5, 1957

Charles Joseph Wenzel  
LL.D., 1902, Charles University,  
Czechoslovakia

D.C.

## DOCTOR OF JURIDICAL SCIENCE

FEBRUARY 22, 1957

James Kenneth Cooney  
B.S., 1943, LL.B., 1947, Indiana University  
LL.M., 1947, The George Washington  
University  
Dissertation: "Common Law Motives  
Officers"D.C. Zigmund Eliaz Jovanovic  
Licentiate in Law, 1944, Royal College  
of Law, Iraq  
M.C.L., 1947, The George Washington  
University  
Dissertation: "Homages Under the  
Local System of Law"

D.C.

JUNE 5, 1957

Donald Leslie Boyer  
B.S., 1931, University of Colorado  
LL.B., 1934, LL.M., 1937, The George  
Washington University  
Dissertation: "Judicial Determination  
of a Case of Inquiry in Accordance  
of Peter Respondeo"Va. City of Evans Brantford  
LL.B., 1937, Virginia Polytechnic  
LL.M., 1937, The George Washington  
University  
Dissertation: "Problems Relating to a  
Federal Constitution of America"

D.C.

## THE SCHOOL OF ENGINEERING

## BACHELOR OF CIVIL ENGINEERING

OCTOBER 20, 1956

William Hox and M. Maken

D.C.

FEBRUARY 22, 1957

Matthew Francis Foster

D.C. M. Maken, James Foster

Agriculture

JUNE 5, 1957

John Henry Charnock, Jr.  
Diplomat Architectural Engineer  
Sergei Kharshchikov  
Arthur Eugene Skene  
B.S., 1941, Northern Michigan College  
of EducationME William Charles Kucharski  
Va. Donald Richard Lutzke  
S. Va. Louis Louis Jones  
Me. Robert William Runkle  
Joseph Lee ScottMaine  
Va.  
Me.  
Me.  
Va.

## BACHELOR OF ELECTRICAL ENGINEERING

OCTOBER 20, 1956

Harold Richard Freidin

ME Edna Patricia Sowell  
P.M.E., 1956, Georgia Institute of  
Technology  
LL.B., 1951, The George Washington  
University

Ga.

Henry H. ... ..	Yes	Member, World Congress
James H. ... ..	Yes	835 S.E. 14th St., University of
James H. ... ..	Yes	Memphis
George A. ... ..	Yes	

[illegible]

OCTOBER 20, 1956

Chester M. Marshall  
James H. Marshall Company

1  
1

Mexico, Central Postal

DC

[illegible]

## FEBRUARY 22, 1957

Walter Foster Kneer 1.

Region	Year	Population	Area	Population Density	Population Growth Rate	Population Growth Rate	Population Growth Rate
North America	1950	150,000,000	10,000,000	15	1.5%	1.5%	1.5%
Europe	1950	500,000,000	10,000,000	50	1.5%	1.5%	1.5%
Asia	1950	1,000,000,000	10,000,000	100	1.5%	1.5%	1.5%
Africa	1950	200,000,000	10,000,000	20	1.5%	1.5%	1.5%
South America	1950	100,000,000	10,000,000	10	1.5%	1.5%	1.5%
Oceania	1950	10,000,000	10,000,000	1	1.5%	1.5%	1.5%
Antarctica	1950	0	10,000,000	0	1.5%	1.5%	1.5%
World	1950	2,500,000,000	10,000,000	250	1.5%	1.5%	1.5%

## OCTOBER 20, 1950

Address: Author: R. H. ...  
 A. I. ...  
 M. I. ...  
 A. I. ...  
 A. I. ...

## FEBRUARY 22, 1957

Mr. Alfred K. Koenig	Wis.	Wisconsin Woodland Workers' Union	Un-
B. S. in F. L. from University of Wisconsin		201 E. Oak Street, Appleton, Wis.	
Mr. Edward J. Moore	Mo.		
B. S. in F. L. from University of Missouri			

## JUNE 5, 1957

[illegible]

## THE SCHOOL OF PHARMACY

## BACHELOR OF SCIENCE IN PHARMACY

FEBRUARY 22 1957

1. *Journal of the American Medical Association*, 1997; 278: 1039-1044.

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## JUNE 5, 1957

MIT, Physics Division	Me	Robt. James, Nottingham	R
<i>(Dutch Lectures in Pharmacology)</i>		A. B. van der Grinten University	
Charles F. Brann, Boston	D/C	Amos	O
Charles Thomas, Portland	Yes	Harv. Biol. Front.	O
<i>Int. Symp. on Cancer</i>	I/C	Amos, Gerald R. J. Boston	A
<i>(Physical Aspects of Pharmacology)</i>		Oxford, England	A
A. B. van der Grinten, State University of Iowa		Van der Grinten, A. B.	A
M. J. van der Grinten, The College of William and Mary		Rensselaer, A. B. Columbia	A
Amos, Robert, College	Me	Morgan, J. M. Columbia	F
Rensselaer, College	Me	Morgan, J. M. Columbia	F
<i>(Dutch Lectures in Pharmacology)</i>		Rensselaer, J. M. Columbia	A
Laurie, Frank, J. Amherst	D/C	Rensselaer, J. M. Columbia	A
Max Thurnham, Edinburgh	I/C	Rensselaer, J. M. Columbia	A
James W. and Paul	I/C	Rensselaer, J. M. Columbia	A
Chadwick, H. J.	I/C	Rensselaer, J. M. Columbia	A
Anthony Frank, Indianapolis	S. J.	Rensselaer, J. M. Columbia	A

## THE SCHOOL OF EDUCATION

## BACHELOR OF ARTS IN EDUCATION

(C) CORNER 20, 10, 50

[illegible]



## 505

FEBRUARY 22, 1957JUNE 1, 1957BACHELOR OF SCIENCE IN HOME ECONOMICS

## FEBRUARY 22 1987

JUNE 8 1957BACHELOR OF SCIENCE IN PHYSICAL EDUCATION

## OCTOBER 29, 1987

Chief, Census Bureau	M.	Robert T. Smith	M.
James W. Smith, Kansas	N. 1	John T. Smith, Virginia	N. 1
Richard C. Smith, Missouri	N. 1	Charles W. Smith	W. 1
James W. Smith, Kansas	N. 1	William M. Smith	Pa.
John T. Smith, Illinois	N. 1		

## FEBRUARY 22, 1957

Richard Porter Gooder	Ohio	James Edward Matting III	Miss
John Oscar Hillman, Jr.	Va.	Raymond Walker Murray, Jr.	Ill.
Andrew Charles Kaden, Jr.	Va.	Robert Lawrence Swenney	N.

## JUNE 5, 1957

John Ray	MI	Georgia Ruth McDaniel	I.
William Frederick Carstelo	Va.	Peter James Spens	N.
Joseph Francis Hance	Pa.		

## MASTER OF ARTS IN EDUCATION

## OCTOBER 20, 1956

Marilyn Eleanore Ayres	Va.	S. G. K. K. K.	Ind.
A.B. 1931, Randolph-Macon		A.B. 1941, American University,	
Washington College		Laurel	
Nancy Fayard Ayres	Va.	Muriel Margaret Leach	Va.
A.B. 1930, Randolph College		B.S. 1931, College of William and	
Park Johnson Ayres	Va.	Mary	
A.B. 1934, Southern University at Memphis		Helen Keating Brownlee	Ohio
Robert E. Bledsoe	N.Y.	A.B. 1938, Western College for Women	
B.S. in Ed. 1939, New York State		Helen Ruth Bledsoe	Va.
Teachers College, Buffalo		A.B. 1939, Randolph-Macon College	
A.M. 1944, Columbia University at		Laura Frances McCaffrey	Mass.
America		A.B. in Ed. 1941, The George	
William Lewis Brown	Fla.	Washington University	
B.S. 1938, U.S. Naval Academy		Lester Burton McFarland	MI
John Earl Dan Brown	MI	A.B. 1935, Maryland State College	
A.B. in Ed. 1941, The George		Charles Palmer May	Va.
Washington University		E. 1941, Randolph College	W.Va.
David Albert Calkins, Jr.	Va.	Larry Virginia Miller	
A.B. 1938, Maryland State College		A.B. 1941, Maryland State College	
Clara McCann Chisley	Pa.	Richard Howard Miller	D.C.
B.S. 1941, Pennsylvania State Teachers		A.B. 1941, Pennsylvania University	
College, East Stroudsburg		Veronica Agnes Miller	Mich.
Mary Craig	MI	B.S. 1941, University of Minnesota	
B.S. 1944, U.S. Naval Academy		Stacy Kathryn Mink	D.C.
Lyons College, Fort	Ill.	A.B. 1941, Illinois College	
A.B. 1941, Wheaton College		John Curtis Smith	Calif.
Roy Alexander Fox	N.Y.	A.B. 1941, Colorado State College	
A.B. 1941, Iowa College		of Fort Collins	
April Hatch	Ind.	Sally Anne Robinson	MI
A.B. 1940, Hunter Teachers		A.B. 1942, A.M. 1945, Marshall	
College, Ind.		College	
William James Haring	N.J.	Margaret Louise Shoup	W.Va.
B.S. in Ed. 1938, New Jersey State		A.B. 1941, Pennsylvania State College	
Teachers College, Newark		Frances Elaine Shoup	Va.
Don G. Harshbarger	Ind.	B.S. 1941, U.S. Naval Academy	
B.S. 1941, Indiana University		Raymond William Smith	Va.
Zella Mae Hise	W. Va.	B.S. 1941, St. Lawrence University	
A.B. in Ed. 1941, Eastern Washington		Frederick Elton White	Calif.
College of Education		A.B. in Ed. 1941, The George	
Angela John Jachalski	N.Y.	Washington University	
B.S. in P.E. 1941, The George		Mary Marie Wagon	MI
Washington University		A.B. 1941, University of Richmond	
Mabel Wallace Justice	Pa.	June Virginia Wagon	Va.
B.S. 1941, Pennsylvania State Teachers		A.B. in Ed. 1941, The George	
College, East Stroudsburg		Washington University	
Richard William Johnson	Va.	Kathleen Louise Ward	Calif.
A.B. 1940, University of Virginia		A.B. 1941, Dickinson Memorial	
Helen Frances Kane	Ind.	College	
B.S. 1941, Wheaton Teachers College		William Scott Wynn	W.Va.
Frederick Robert Kaulitz	N.C.	A.B. 1941, Maryland State College	
A.B. 1941, Georgetown College		Henry Edward Vail	Va.
Zella Lee Kaye	Va.	A.B. 1941, Randolph-Macon College	
A.B. in Ed. 1941, The George		William Andrew Young	Ill.
Washington University		B.S. 1941, Pennsylvania State Teachers	
Father Khalil	Ind.	College, Marshall	
A.B. 1941, Hunter Teachers College,			
Ind.			

## FEBRUARY 22, 1957

Sarah Louise Ayres B.S. 1935, Alabama College	Va.	Vernie Velazquez Menard B.S. in Education, Union College of Mexico	D.C.
Margaret Anne Beale A.B. 1937, The George Washington University	Md.	Frederic Vincent Menard B.S. in Ed. 1937, Pennsylvania State University	Md.
Frankie Susan Bortman A.B. in Ed. 1939, The George Washington University	Va.	Franklin Collins, Mansfield B.S. 1939, South Dakota State University	Md.
Lucile Hollister DeAngelo B.S. in P.E. 1939, The George Washington University	Va.	James Earl Rice B.S. 1938, Pennsylvania State University	D.C.
Lucile Marie Evans M.A. 1939, University of Michigan	Md.	Frederick Amy Stephens A.B. 1939, York Junior University	D.C.
Charles Francis Faust B.S. in Ed. 1939, Pennsylvania State University	Pa.	Miss Sarah Williams A.B. 1939, Texas Technological College	Texas
Georgia Edna Gault A.B. 1939, Long Island University	Va.	William Floyd Williams Ed. 1939, Wisconsin State College, Wisconsin	Wis.
William George Hall A.B. 1939, Iowa State Teachers College, Minnesota	D.C.	John Joseph Wolford B.S. in P.E. 1939, The George Washington University	Va.
Nancy Ellen Long A.B. in Ed. 1941, New York State Teachers College, New York	Md.	Leahann Collins Young B.S. 1938, U.S. Military Academy	Va.
Joseph Charles McGowan B.S. 1941, Pennsylvania State University	Va.		

## JUNE 5, 1957

Lillian Wilma Baker B.A. 1951, University of Minnesota	Miss.	Johnny Lawrence McElroy A.B. 1951, The George Washington University	Va.
Rosemary Miller Berman B.S. 1951, Ohio State College	D.C.	Nella H. McElroy, Miss. B.S. 1951, Ohio State University	Va.
Ruby Anne Blevins B.S. 1951, Ohio State College	D.C.	James Earl Moore B.S. 1951, Ohio State University	Miss.
Jack Wood Chalmers A.B. 1951, Ohio State College	D.C.	Miss. American Mission A.B. 1951, Ohio State University	Va.
Larson Robert Collins A.B. 1951, Ohio State College	Va.	Home University of Ohio State College	D.C.
John James Cook B.S. 1951, Mississippi State Teachers College, Mississippi	Md.	Shirley Marie DePaul B.S. 1951, University of Illinois	Ill.
Nathaniel Richard Crane B.S. 1951, Ohio State College	D.C.	Nathan Rouse Crane A.B. 1951, Ohio State College	Md.
Alfred M. Crane A.B. 1951, Ohio State College	Ill.	Miss. Ohio State College A.B. 1951, Ohio State College	D.C.
Lucas Francis Crumpton A.B. 1951, Mississippi State University	D.C.	Henry Augustus Jones III A.B. in Ed. 1951, The George Washington University	Va.
Barbara Ann Crumpton A.B. 1951, Ohio State College	Va.	William William Harrison A.B. 1951, University of California, at Santa Barbara	Md.
Edward Albert Crumpton A.B. 1951, Ohio State College	D.C.	Frederick H. Harrison B.S. 1951, Mississippi State Teachers College, Wisconsin	D.C.
George Kay Cullum B.S. 1951, Ohio State College	Md.	Leahann Collins Young B.S. in Ed. 1951, West Virginia University	Md.
William R. Cullum B.S. in Ed. 1951, A.B. 1951, Mount Herrick College	D.C.	William Eugene Wolford B.S. in Ed. 1951, The George Washington University	Pa.
Ruby Ellen Felt A.B. in Ed. 1951, The George Washington University	N.C.	John Joseph Wolford B.S. in P.E. 1951, The George Washington University	Va.
Allen Carson Felt B.S. 1951, Ohio State College	Md.		
Ruby Ellen Felt B.S. 1951, Ohio State College	Md.		
William R. Cullum A.B. 1951, Ohio State College	D.C.		



## ADVANCED PROFESSIONAL CERTIFICATE

FEBRUARY 22, 1957

Edward G. Gage House

A.B. in Ed. A.M. in Ed. 1955: The  
George Washington University

Md.

JUNE 5, 1957

John H. Harkness-Brown, Jr.

B.S. 1951, Master's Washington College  
A.M. 1954, The George Washington  
University

Va.

Faculty Council, Eastern

Ill. 1951, Madison College

A.M. 1954, The George Washington  
University

D.C.

## DOCTOR OF EDUCATION

OCTOBER 20, 1956

David E. E. E. E.

Ph.D. 1956, The George Washington University

M.A. 1954, New York State College

Education, Albany

Thesis: A Comparative Study of  
the Development of Teacher Education

Md.

FEBRUARY 22, 1957

Helen M. M. M.

A.B. 1951, Mount Holyoke College

A.M. 1954, New York State College

Education, Albany

Thesis: Administrative and Financial

Control: Techniques with Special Refer-  
ence to Course Offering

N.Y.

Miss T. T. T.

Ph.D. 1954, University of Minnesota

Ed.M. 1951, Iowa State University

Thesis: "Organizational and Financial

Control: Problems in Iowa State Uni-

versity Programs with Special Refer-

ence to a Comparative Analysis of

the Executive Program

Md.

JUNE 5, 1957

Frank G. G. G.

B.S. 1951, Mount Holyoke College

A.M. 1954, New York State College

Education, Albany

Thesis: "Organizational and Financial

Control: Techniques with Special Refer-

ence to a Comparative Analysis of

the Executive Program

N.C.

## THE SCHOOL OF GOVERNMENT

## BACHELOR OF ARTS IN GOVERNMENT

OCTOBER 20, 1956

LeRoy H. H. H.

B.S. 1951, Mount Holyoke College

A.M. 1954, New York State College

Education, Albany

Thesis: Administrative and Financial

Control: Techniques with Special Refer-

ence to a Comparative Analysis of

the Executive Program

N.Y.

John F. F. F.

B.S. 1951, Mount Holyoke College

A.M. 1954, New York State College

Education, Albany

Thesis: Administrative and Financial

Control: Techniques with Special Refer-

ence to a Comparative Analysis of

the Executive Program

Va.

Gov.

Va.

N.Y.

I.C.

Va.

Gov.

Md.

Va.

I.C.

N.Y.

Md.

Md.



## FEBRUARY 22, 1957

Norman Avalon	Israel	Charles Robert Mowbray	Y
Norman Fink Rosenberg	Pa	Charles Robert Neider	Y
Adrian Herbert Brown III	Pa	Clifford Carl Newman	W
James Daniel Clark	Va	Robert John Pankard	Y
John Donald Dornach	Me	Allen Lee Papp	D-C
Robert David Lockson	N-D	Leona Jean Rogers	Teas
William Lee Fane Jr.	Va	William A. Schuchman	
Seamus Paul Gorman	Me	Robert Lee Pankard	Va
James Albert Kilgus	D-C	Harold Ray Rappaport	N.Y.
David Karson - Koss	Va	Robert Lee Rappaport	Me
George de Courcy Lapsade	Va	James Lee W. Smith, Jr.	Va
Robert Bruce Laster, Jr.	Me	William Gerald Yarbrough	N.Y.
Harriet Stettin Marx	Va		

## JUNE 5, 1957

George Edward Abell	Me	James Fleming Lay	Va
James M. Adams	Kans	George Lee A. Ling	Ill
Albert George Adams	Va	Martin Matthews Lopez	Puerto Rico
Kennerly Charles Barnes	D. C.	Alvin Martin	Calif.
Joe Louis Barnes	Texas	Anthony Russell Marshburn	Va
John Van Gosen Beatty	Va	Thomas John McGraw	Pa.
Paul Bergeson	D. C.	Frank William Marshall	D. C.
James Edward Butler	Va	James Franklin Mayhew	N. C.
Mary Louise Camp	D. C.	Robert Howard Neal	Va
James William Camp	Va	Jack Newman	D. C.
Ann Leona Campbell	D. C.	Earl Nichols	Me
John Henry Casey	Va	Kenneth John Palmer	Me
Christopher Carter	Va	Frank Penn	N. C.
Charles Robert Chandler	Me	May Francis Peck	Texas
William George Chiswick	D. C.	Art Maria Power	Ohio
Philip Christopher Clancy	N. Y.	Charles Frederick Pugh	D. C.
Garrett Holt Clendenen	N. Y.	Charles Lewis Pugh	Calif.
Alfred George Clifton	Va	Leon Lewis Rice	Me
Thomas Marshall Joseph Crowley	Me	Gerry Michael Richmond	N. Y.
John Thomas Cullen	D. C.	Marion Joseph Ross	D. C.
Paul Joe Davis	D. C.	James Ryan	(With description)
John William Dealey	Texas	Robert Warren Schneider	Ill
Edward John Deane, Jr.	Va	John Seabright	D. C.
Harold Lee Deane	W. Va.	Harold James Seabright	D. C.
William Deane Palmer	Va	David Allen	D. C.
James Thomas Dexter	D. C.	James Edwin Scott	Ill
James Alexander Field	D. C.	Earl Clarence Smith Jr.	Ill
James Arthur Gandy	Va	Frank Smith	Ind.
James Arthur Gandy	D. C.	Richard Smith	Va
James Randolph Gentry	Calif.	Lawrence William Stewart	Me
George Richard Gentry, Jr.	Va	James Allen Stinson	Me
Paul George Gentry	Va	Robert Lewis Stinson	Va
Edward George Gentry	N. C.	William Franklin Stinson, Jr.	Va
George Edward Gentry	D. C.	William Franklin Stinson	Va
James Thomas Gentry	Me	Richard George Stinson	Ind.
Frank Andrew Gentry, Jr.	Ind.	James William Thompson	Ind.
James Andrew Gentry	Ill	(With description)	(With description)
Charles Frank Gentry, Jr.	Ill	John Hiram Thompson	N. C.
Charles Frank Gentry	Ill	John George Thompson	N. C.
Charles Frank Gentry	Ill	James Lee Thompson	Ind.
James William Gentry	N. Y.	Charles Frank Thompson	Me
Marion Allen Gentry	D. C.	John Hiram Thompson	D. C.

MASTER OF ARTS IN GOVERNMENT

## OCTOBER 20, 1959

[illegible]

Edgar Anthony Chavarrin	Calif	Thomas John Kuchera	N.D.
A.B. 1949, University of Southern California		A.B. 1947, College of St. Thomas	
Wayne Austin Coomer	Ala	Robert Charles Lyle	Wash.
B.S. & B.A. 1941, Alabama Polytechnic Institute		A.B. 1940, University of Washington	
Lydia Whelan Cronin	Ohio	Peter Stephen MacLean	Fla.
A.B. 1944, University of Denver		B.S. 1944, University of Maryland	
Harold Wayne Dumbledge	Ill	Robert Murray McAllister	N.C.
A.B. 1945, Aurora College		A.B. 1940, University of North Carolina	
Harriet Rindt Gaudin	Va.	Harold Ahmed Nasser	Pakistan
A.B. 1945, Falmouth College		A.B. 1942, University of Punjab, Pakistan	
Richard Neil Hanson	Fla.	A.M. 1949, University of Delhi, India	
B.S. 1947, University of Maryland		L.I.B. 1944, University of Karachi, Pakistan	
Munira Ahmad Hossain	Egypt	William Thomas O'Connor, Jr.	R.I.
A.B. 1947, Faisal University, Egypt		A.B. 1947, Brown University	
Albert Charles Hovner	Texas	Thomas Nicholas Peckard, Jr.	Va.
B.S. 1947, University of Maryland		A.B. 1947, University of Richmond	
Vivian Harty Jakubsky	Pa.	Robert Charles Rogers	Texas
A.B. 1945, Sacramento State College		B.S. 1945, University of Maryland	
David Bruce Jones	Calif	Robert Thomas Scott	Pa.
B.S. 1941, University of Maryland		B.S. 1944, Georgetown University	
Charmaine Koenigsmeyer	Ill.	Clay Carter Stapp, Jr.	Texas
L.I.B. 1947, Thompson University, Portland, Ore.		B.A. 1947, Southern Methodist University	
Naima Fouad A. Kary	N.Y.	Mary Daniel Zinn	Wis.
B.S. 1947, U.S. Military Academy		A.B. 1947, Reed College	
Richard Alan Kellner	N.Y.		
B.S. 1947, U.S. Military Academy			

## FEBRUARY 22, 1957

Albert A. Samanie	Iraq	Mary Alida Holman	Texas
B.A. & B.A. 1947, University of California		A.B. 1947, 1948, The George Washington University	
William Charles Dunning	D.C.	Blanca Lynn Wilson	Ind.
A.B. 1947, 1948, The George Washington University		A.B. 1947, 1948, The George Washington University	
Lila Thomas Hallock	D.C.		
B.S. 1947, University of Maryland			

## JUNE 5, 1957

Mansour Said Hattamel	Jordan	Alicia Antonia Paez	Venezuela
A.B. 1947, American University at Cairo, Egypt		A.B. 1948, A.M. 1949, Cambridge University, England	
Anita Lee Henschel	Md.	David Mayne Packer	Mass.
A.B. 1947, 1948, The George Washington University		A.B. 1947, Bates College	
Mary Dorothy Horton	D.C.	Mohammed Asad Khan	Pakistan
A.B. 1947, University of Missouri		A.B. 1945, Punjab University, Pakistan	
Doris Robert Hunter	Iowa	Mohammed Asad Khan	Pakistan
A.B. 1947, The George Washington University		A.B. 1947, University of Kabul, Afghanistan	
Scott Lewis Lyle	Va.	Michael Wright Wooten	Ga.
A.B. 1947, Mississippi College		A.B. 1947, 1948, The George Washington University	
Aruna Mahan	India		
A.B. 1947, University of Bombay, India			
A.B. 1947, Cambridge University, England			

## MASTER OF ARTS IN PUBLIC ADMINISTRATION

OCTOBER 20, 1956

Thomas Samuel Lenzel	Fla.	Rigoberto Enrique Pineda	Panama
A.B. 1947, The George Washington University		A.B. 1947, University of Panama	

JUNE 5, 1957

James W. J. Austin	N.C.	First Elder, Westminster
A.B. 1955, 1957, The College of William and Mary		A.B. 1955, 1957, The College of William and Mary
Arthur M. Johnson	Illinois	
A.M. 1957, University of Chicago		
Norman F. Jones	Ohio	
A.B. 1957, University of Cincinnati		
H.B. 1957, University of Cincinnati		
H.M. 1957, The College of William and Mary		

MASTER OF ARTS IN PERSONNEL ADMINISTRATION

OCTOBER 20, 1956

James L. Jones	Illinois	Robert L. Jones	Ill.
A.B. 1956, University of Illinois		B.S. 1956, University of Illinois	
Thomas F. Jones	Calif.	Robert L. Jones	Ill.
B.S. 1956, University of Maryland		B.S. 1956, University of Illinois	

FEBRUARY 22, 1957

Robert L. Jones	Ill.	Robert L. Jones	Ill.
A.B. 1957, Western College		A.B. 1957, Western College	
A.M. 1957, University of Illinois		Robert L. Jones	Ill.
Thomas F. Jones	Calif.	B.S. 1957, University of Illinois	
A.B. 1957, University of Illinois			

JUNE 5, 1957

Robert L. Jones	Ill.	Robert L. Jones	Ill.
A.B. 1957, Western College		B.S. 1957, Western College	
A.M. 1957, University of Illinois		Robert L. Jones	Ill.
Thomas F. Jones	Calif.	B.S. 1957, University of Illinois	
A.B. 1957, University of Illinois			

MASTER OF BUSINESS ADMINISTRATION

OCTOBER 20, 1956

George H. Jones	Calif.	George H. Jones	Calif.
B.S. 1956, University of California		B.S. 1956, University of California	
James R. Jones	Calif.	James R. Jones	Calif.
B.S. 1956, University of California		B.S. 1956, University of California	
Howard E. Jones	Ill.	Howard E. Jones	Ill.
B.S. 1956, University of Illinois		B.S. 1956, University of Illinois	
James R. Jones	Ill.	James R. Jones	Ill.
B.S. 1956, University of Illinois		B.S. 1956, University of Illinois	
John E. Jones	N.M.	John E. Jones	N.M.
A.B. 1956, University of Texas		A.B. 1956, University of Texas	
James E. Jones	Ill.	James E. Jones	Ill.
A.B. 1956, University of Illinois		A.B. 1956, University of Illinois	
Paul E. Jones	N.M.	Paul E. Jones	N.M.
A.B. 1956, University of Illinois		A.B. 1956, University of Illinois	
Thomas E. Jones	Pa.	Thomas E. Jones	Pa.
B.S. 1956, University of Illinois		B.S. 1956, University of Illinois	
George H. Jones	Calif.	George H. Jones	Calif.
A.B. 1956, University of Illinois		A.B. 1956, University of Illinois	



Michael Ondaatje B.A. 1975, University of Manitoba	Other	Director, Writers' Studio, U.C. at York University	Pres.
Robert R. Milder B.A. 1961, U.C. at Madison, Wis.	Member	Chair, U.C. at York University B.A. 1961, U.C. at Madison, Wis.	Sec.
Franklin Lewis Brown B.A. 1961, University of Maryland	Guest	Hon. Fellow, Writers' Studio, U.C. at York Univ. 1989-1990	Adm.
Charles F. Brinkley B.A. 1971, University of Maryland	Inv.	Director, Writers' Studio, U.C. at York University	Man.
Robert M. Coates B.A. 1967, University of California	Trustee	B.A. 1967, University of Maryland	Chair

## FEBRUARY 22, 1987

[illegible]

## JUNE 5, 1957

[illegible]



## ASSOCIATE IN ARTS

[illegible]

Number of people in household	Age	Employed/Unemployed/Retired	Income
1-2	3-4	5-6	7-8
1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16
17	18	19	20
21	22	23	24
25	26	27	28
29	30	31	32
33	34	35	36
37	38	39	40
41	42	43	44
45	46	47	48
49	50	51	52
53	54	55	56
57	58	59	60
61	62	63	64
65	66	67	68
69	70	71	72
73	74	75	76
77	78	79	80
81	82	83	84
85	86	87	88
89	90	91	92
93	94	95	96
97	98	99	100

TABLE 2. (Cont.)			
Major General Division	Code	Line Project Name	Yr
1. West District		1. West District	1976
2. East District		2. East District	1976
3. Central District		3. Central District	1976
4. North District		4. North District	1976
5. South District		5. South District	1976
6. West District		6. West District	1976
7. East District		7. East District	1976
8. Central District		8. Central District	1976
9. North District		9. North District	1976
10. South District		10. South District	1976
11. West District		11. West District	1976
12. East District		12. East District	1976
13. Central District		13. Central District	1976
14. North District		14. North District	1976
15. South District		15. South District	1976
16. West District		16. West District	1976
17. East District		17. East District	1976
18. Central District		18. Central District	1976
19. North District		19. North District	1976
20. South District		20. South District	1976
21. West District		21. West District	1976
22. East District		22. East District	1976
23. Central District		23. Central District	1976
24. North District		24. North District	1976
25. South District		25. South District	1976
26. West District		26. West District	1976
27. East District		27. East District	1976
28. Central District		28. Central District	1976
29. North District		29. North District	1976
30. South District		30. South District	1976
31. West District		31. West District	1976
32. East District		32. East District	1976
33. Central District		33. Central District	1976
34. North District		34. North District	1976
35. South District		35. South District	1976
36. West District		36. West District	1976
37. East District		37. East District	1976
38. Central District		38. Central District	1976
39. North District		39. North District	1976
40. South District		40. South District	1976
41. West District		41. West District	1976
42. East District		42. East District	1976
43. Central District		43. Central District	1976
44. North District		44. North District	1976
45. South District		45. South District	1976
46. West District		46. West District	1976
47. East District		47. East District	1976
48. Central District		48. Central District	1976
49. North District		49. North District	1976
50. South District		50. South District	1976
51. West District		51. West District	1976
52. East District		52. East District	1976
53. Central District		53. Central District	1976
54. North District		54. North District	1976
55. South District		55. South District	1976
56. West District		56. West District	1976
57. East District		57. East District	1976
58. Central District		58. Central District	1976
59. North District		59. North District	1976
60. South District		60. South District	1976
61. West District		61. West District	1976
62. East District		62. East District	1976
63. Central District		63. Central District	1976
64. North District		64. North District	1976
65. South District		65. South District	1976
66. West District		66. West District	1976
67. East District		67. East District	1976
68. Central District		68. Central District	1976
69. North District		69. North District	1976
70. South District		70. South District	1976
71. West District		71. West District	1976
72. East District		72. East District	1976
73. Central District		73. Central District	1976
74. North District		74. North District	1976
75. South District		75. South District	1976
76. West District		76. West District	1976
77. East District		77. East District	1976
78. Central District		78. Central District	1976
79. North District		79. North District	1976
80. South District		80. South District	1976
81. West District		81. West District	1976
82. East District		82. East District	1976
83. Central District		83. Central District	1976
84. North District		84. North District	1976
85. South District		85. South District	1976
86. West District		86. West District	1976
87. East District		87. East District	1976
88. Central District		88. Central District	1976
89. North District		89. North District	1976
90. South District		90. South District	1976
91. West District		91. West District	1976
92. East District		92. East District	

## (OCTOBER 20, 1956)

OCTOBER 20, 1950			
A. J. ...	N Y	...	...
W. ...	...	...	...
R. ...	...	...	...
S. ...	...	...	...
W. ...	...	...	...
...	M	...	...

Isotopologue	Obs.	Calculated	Ratio
$\text{C}_2\text{H}_2$	100	100	1.00
$\text{C}_2\text{H}_2^{13}\text{C}$	1.0	1.0	1.00
$\text{C}_2\text{H}_2^{18}\text{O}$	0.1	0.1	1.00
$\text{C}_2\text{H}_2^{13}\text{C}^{18}\text{O}$	0.01	0.01	1.00
$\text{C}_2\text{H}_2^{13}\text{C}_2$	0.01	0.01	1.00
$\text{C}_2\text{H}_2^{18}\text{O}_2$	0.01	0.01	1.00
$\text{C}_2\text{H}_2^{13}\text{C}_2^{18}\text{O}$	0.001	0.001	1.00
$\text{C}_2\text{H}_2^{13}\text{C}_2^{18}\text{O}_2$	0.0001	0.0001	1.00

[illegible]
$$O_{C^1}(\mathbb{R}^n) \hookrightarrow C^1(\mathbb{R}^n) \hookrightarrow C^0(\mathbb{R}^n)$$
[illegible]

FEBRUARY 22, 1987			
Mrs. Howard H. Jones, Center A.B. Jones, University of New York Vassar College, Poughkeepsie	Yes	John W. Jones, The Center for the Study of the Development of Language	Yes
A.B. Jones, 1111 E. 10th Street Wilmington University	Yes	John W. Jones, The Center for the Study of the Development of Language	Yes

William Eugene Jenkins	Misc	William Oscar Soderstrom	Misc
B.S. A. 1921, University of Missouri		B.S. 1915, University of Oklahoma	
Civil Action, Lincoln	Misc	Robert Louis Telford	
B.S. 1921, Washington College		B.S. 1916, Sophia University, Japan	
Alston James Mullins	Va	Dennis Moseley Wright	Nat
B.S. 1921, U. S. Military Academy		A.B. 1924, Nebraska State Teachers	
Joseph Francis O'Rourke	Misc	James P. Young	
A.B. 1927, Tufts University		James Albert Williamson	Ed
Thomas F. Patrick Baker	Art	B.S. 1921, University of Florida	
B.S. in B.A. 1927, University of Arizona			

## JUNE 5, 1957

George Clinton Aycock, Jr.	Ph	Myron George Miller	Ed
D. B. 1917, The George Washington		B.S. 1917, University of Nebraska	
University		Alvin H. Miller	Misc
Alvin H. Miller	Trans	A.B. 1917, University of Nebraska	
B.S. 1918, University of Missouri		Charles F. Miller	Va
One Mile Drive		B.S. 1917, M.S. 1921, University of	
B.S. 1917, University of Missouri		Nebraska	
Richard Thomas Miller	Va	Frederick R. Miller	Va
B.S. 1918, University of Missouri		A.B. 1917, University of Nebraska	
Alvin Tom Miller	Misc	Samuel R. Miller	Ed
A.B. 1918, Saint Andrew's College		A.B. 1918, University of Nebraska	
Phonetic Bible Study		William F. Miller	Va
A.B. 1918, Saint University of Iowa		A.B. 1918, University of Nebraska	
Robert William Miller	Misc		
A.B. in Law, 1917, The George			
Washington University			

## THE GRADUATE COUNCIL

## DOCTOR OF PHILOSOPHY

## OCTOBER 20, 1956

George Alexander Black	Phil	Thomas George Parker	P.C.
A.B. 1921, University of California		A.B. 1917, University of Kansas	
Disquisition: A Taxonomic Treatment		A.M. 1924, The George Washington	
of the Insect Anopheles		University	
Elmer Art Blackledge Jones	Misc	Thomas George Parker	Phil
B.S. 1921, M.S. 1925, The George		University	
Washington University		George Arthur Clark	
Disquisition: "Phylogenetic Analysis		A.B. 1921, A.M. 1924, The George	
and a Taxonomic Investigation of the		Washington University	
Insects"		Disquisition: "The S. R. Clark	
Albert Enckler	Ph	of the American	
A.B. 1921, M.S. 1925, The George		Richard Arthur Clark	N.Y.
Washington University		B.S. 1921, The George	
Disquisition: "Contributions to the		Washington University	
Exploration of a Statistical Method		Disquisition: "On the Mechanism of	
for Inducing Insecticide Resistance		in Insects"	
in the Insect Anopheles			
Clark to George Alexander Black			
Employing J. H. Alexander Black			
Phonetic Bible Study			
Phonetic Bible Study			
Phonetic Bible Study			

## FEBRUARY 22, 1957

Morton Karpman	Va	Alvin H. Miller	Va
B.S. 1918, College of the City of		A.B. 1917, A.M. 1924, The George	
New York		Washington University	
A.M. 1921, The George Washington		Disquisition: "The Management and	
University		Program of Southern Insects"	Ed
Disquisition: "Factors Affecting the		Robert W. Miller	
Evolution of the Insect Anopheles		B.S. 1918, The George Washington	
and the Insect Anopheles		M.S. 1921, The George Washington	
Arthur Rubin Lewis, Jr.	D.C.	University	
A.B. 1921, A.M. 1924, The George		Disquisition: "Contributions to the	
Washington University		of Natural and Experimental Rats	
Disquisition: "Contributions to the			
Evolution of the Insect Anopheles			
and the Insect Anopheles			

Charles Haynes McCull, Jr. A.B. 1935, A.M. 1938, The George Washington University Dissertation: "The Liberal Hypothesis, Inflationism, and the American of Vietnam"	MI	History Woodstock B.S. 1935, Graduate of the City of New York M.S. 1938, The George Washington University Dissertation: "Studies on a Hydroxy-alkyl Methylene"	MI
Marion E. Kuhn Nair B.S. 1937, M.S. 1938, The George Washington University Dissertation: "Contributions to Physical Chemistry: I. The Hydrolysis of Methylamine Phosphate; II. The Hydrolysis of Methylamine, the Acetic Acid, and Carbon (III)"	Va.	Dorothy Margaret Wilson A.B. 1937, Cambridge University, England M.S. 1938, Stanford University, England Dissertation: "The Metabolism of L-Ribonucleic by <i>Leishmania</i> Cells"	Mo.
Major Ronald Jones A.B. 1938, University of Connecticut M.S. 1942, University of Maryland Dissertation: "The Amino Acids of <i>Escherichia</i> and Their Fermentation Products"	W.Va.		

JUNE 5, 1957

Nicholas Vincent Carroll B.S. 1945, Georgia College M.S. 1948, The George Washington University Dissertation: "The Influence of Parental Homosexuality on the Development of Male Homosexuality in the Prairie Zebra"	Pa.	John William Kaiser B.S. 1945, Northwestern University A.M. 1947, The George Washington University Dissertation: "New Self-Exhausting Reaction and Concomitant Action in the Liquid State"	Texas
Marysue Katherine Cook B.S. 1945, College of William and Mary M.S. 1948, The George Washington University Dissertation: "Three Culture Studies of the Reproductive Parts of <i>Yucca</i> Plants"	Va.	Ida K. Jones B.S. 1945, Stanford University M.S. 1948, The George Washington University Dissertation: "Effects of Chemical Agents on Free Radicals and Protein Cell Structure in Tumor Growth"	Mo.
Heather Thomas Durrant B.S. 1945, University of the City of New York M.S. 1947, Iowa State College Dissertation: "Asking, Translocation, or Virus-Induced Protein and Peptide of Cervical Rubella"	MI	Harriet Frances Fink B.S. 1945, University of Michigan M.S. 1948, The George Washington University Dissertation: "Some Features of the Tumor and Ovarian Tumor Systems in Genetic-Spontaneous Strains"	Mass.
Jack Victor Gidley B.S. 1945, A.M. 1947, Boston University Dissertation: "A Study of Substrates Available to <i>S. aureus</i> and an Artificial Polysaccharide"	All.	Dorothy Jane Taylor A.B. 1945, Barn University M.S. 1948, Iowa State College Dissertation: "The Effect of Environmental Factors on the Growth of <i>Escherichia coli</i> "	Texas
Allen Oliver Hays, Jr. B.S. 1945, U.S. Military Academy A.M. 1948, Virginia Polytechnic University Dissertation: "The Physiology and Neurology of Chaperones"	Mass.	William Wallace Lough, Jr. A.B. 1945, Temple University M.S. 1948, The George Washington University Dissertation: "Functions of Abnormal Carbohydrate Systems in the Liver and in <i>Escherichia coli</i> "	MI
Earl Marion Jones A.B. 1945, A.M. 1948, The George Washington University Dissertation: "A Study of Proteinase and Lipase in the <i>Paramecium</i> Cell"	D.C.	Charles Earl Webb B.S. 1945, A.M. 1948, Northwestern University Dissertation: "A Study of Microorganisms in Greenhouse Insecticide"	I.L.C.

HONORARY DECREE

FEBRUARY 22, 1957

Robert William Blandin—*Doctor of Letters*

JUNE 5, 1957

Newton William Lyons—*Doctor of Laws*  
Fletcher Maxwell—*Doctor of Laws*

Robert Clement Watson—*Doctor of Laws*



## RECIPIENTS OF AWARDS

1956-57

### SCHOLARSHIPS

- The Alpha Zeta Omega Scholarship*: Morton Kimm  
*The Alumni Scholarship*: Frank Arthur Gregory, James Troy Harris (fall semester), Richard Sabin Lykes, Joseph Donald McLandrum, Jr., Norman Sahlong, Carl Donald Schreier  
*The American Foundation for Pharmaceutical Education Scholarships*: Marion Celia Manning, Bernard Manning Pinsky, Janet Myers Thomas  
*The American Society of Women Accountants Scholarship*: Joanne Delores Miller  
*The Byron Andrews Scholarship*: Frances Barbara Pross (fall semester)  
*The Anna Bensch Scholarship*: Ruth Vera Raveil  
*The Everett Leonard Broun Scholarship*: George Lee  
*The Emma K. Carr Scholarship*: John Vincent Carfield, Edward Parker Crompton, Edward Lamar Galloway, Thomas Page Johnson, Michael G. Korman, Eugene Isaac Lashon, Melvin Abe Martin, Alex Donald Michal, Frank Perry, Jr., James Alfred Perschy, John James Terauchi, Paul Joseph Trantach, David Marvin White  
*The Henry Harding Carter Scholarship*: Jerry Kaminsky  
*The Maria M. Carter Scholarship*: Warren Allen Davis  
*The Gai Omega Scholarship*: Phyllis Morrison  
*The Daughters of the American Revolution Scholarship*: Jean Marjorie Scott  
*The Isaac Davis Scholarship*: Leona Anna Tamm  
*The District of Columbia Pharmaceutical Association Scholarship*: Cyrie Thomas DiNenno (fall semester)  
*The George Washington Daring Memorial Scholarship*: Walter Lawrence Benning  
*The School of Engineering Scholarship*: John Clifton Clark, Anne Lee Kopp, Henry Cushman Mayo, Richard Lee Peterson, Stephen Arthur Thon (fall semester)  
*The Hyatt Parsons Dorr Scholarship*: Otis Eugene Kim  
*The Robert Foreman Scholarship*: Sarah Harlan Weeks  
*The General Motors College Scholarship*: William LaVone Chatterton, George Bruce Taylor  
*The Anna Sophie Hempel Scholarship*: Lisa Duke Carter  
*The Eliza Loring Hanson Scholarship*: Violet Eva Rabin  
*The Hamilton Scholarship*: Fanning Marion Fenn  
*The High School Scholarships*: Wendell Lloyd Atkins, Beverly Lynn Atkinson, Marvin Eugene (fall semester), James Earl Brimley, Wayne David Brimley, Beverly Andrea Brown, James Lee Brown, Robert George Calton, Ted Paul Clark, Nancy Ann Olson, Anna Nicholas DeKromby, Barbara Ruth Drake, Elizabeth Ann Henschel, Michael William Doe, Jennifer Christine Long, Jr., Park William Frieschade, Jr., Edith Margaret Frieson, Karen Marie Fright, David Herck Fries, August Ann Genta, James Mary Gray, Margaret Ann Harrison, Ronald Hugh Gerdner, George William Hedberg, Mary Elizabeth Hoffman, Harold Duane Hoffman, Lucile Clark Howell, Judith Zella Jahn, LARRY Kato, Lawrence Kutz, Nancy Jean Kuster, Pamela Charal LaPine, Ronald Golden Larson, Richard Paul Little, Sylvia Ann Morrison, Robert



- Paul Meyers, Gerald Casade, Martin, Faye Glen, Marjorie, Elizabeth Ann Murray, David Mervin Perkins, Stanley Nathan Pickart, Stella Jean Prodan, Martha Raye Piquet, Jack Furman Purinton, Martin Hugh Reardon, Robert Halton Reich, James Edward Robert, Helen Grace Sackmuth, Ernest Ralston Shuler (full amount), Mary Susan Shumway, Harry Lancaster Shaw, Ann Marie Simpson, David Perry Stanton, Nadia Jane Stuchlik, Anne Margaret Symmak, William Griffin Tammara, Valery Thomas, Bertha Rose Treman, Harold Lee Tressman, Freda Guss Tucker, Robert Mark W., Walter Luke Wing.
- The High School Division, Continuous Scholarships:* Ann Jane Goldstein, Charles Richard Landon, Jr., Judith Keating Shusterman.
- The Kappa Alpha Theta Scholarships:* Carol Francis Dulaney.
- The Kappa Psi Scholarships:* Ivan M. Elm.
- The Law School Scholarships:* William James Croftman III, Philip Arthur Gosses, Frank Vincent Jones, I. Ann Marie Kelly, Charles Ann Mahon, William Albert Nash, New Taring Scott.
- The Pi Sigma and James E. Meyer Scholarships:* Duane Ann Bawn, Edward Duane Cramer (amount amount), Paul Constantine Douglas, Melissa Erik Gussis, Anne Catherine McDonald (full amount), Eric Jane Madhuk, William Stuart Rieck, Mary Susan Tressman (young amount), Suzanne Ellen Thompson, Orr, Harriet Upton, Jr., Ruth Helen Wessing (full amount).
- The A. M. C. Scholarships:* William Warren Swanson.
- The National League of Women Clubs Scholarships:* Donald Joseph Krammer.
- The Nominations Scholarships:*
- The Young Star:* Lisa Gerald Hughes, Richard Earl Turner.
- The Washington Post-Alumni:* James Croftman, Robert Francis O'Connor, John C. Schuler (full amount).
- The Parkettes:* Annaliese of Washington, D. C. Scholarships: Carolyn Ann Cramer.
- The Paul Pearson Scholarships:* Robert Thomas Ruckert.
- The Phi Delta Theta Scholarships:* David Lee Wessing.
- The Lela M. Shepard Scholarships:* James Ann Hamilton, Robert Brannon Jones, Jr.
- The Delta Sigma:* Scholarships: Mary Lark Krammer.
- The Mary Louisa Shaw Scholarships:* Jean Anne Krammer.
- The Student Activities Scholarships:* Milton, Anthony Alving (full amount), Jack Ann Arthur, Charles Be Anthe, Arthur Baker, Anne A. Barthel, Jr., Harriet Old Bond, Jr., Susan Bork (full amount), William John Barry, George Edward Bickerton, Donald Walter Brownson, Richard Martin Brundley, Lee, Louis Browne (full amount), Robert Brian Buckle (full amount), Arthur Donald Brundley, Henry Frederick Bunker, Richard James Cram (full amount), Robert Charles Cramer, Richard Charles Cramer, Thomas Paul Ayler, Arthur Oswald Cramer, Gene D'Aquino, Donald Arthur Dugan, Kenneth Michael De Mott, Philip Douglas Dugan (full amount), Jean Suzanne Felt, full amount, Michael James, James George Jackson, William Albert Felt, William Hugh Felt, Edward Marvin Feltman, Robert Frank Felt, Martin Thomas Gellert, William Thomas Gussis (full amount), Frances Joseph Gussis, Robert William Gussis (full amount), John Emerson Gussis (full amount), Thomas Michael Gussis, William Taylor Hearn (full amount), Dr. David Hearn, Allen Hanson, Donald Hearn, John Frank Hearn, Donald Charles Hearn, Joseph Francis Hearn, Thomas John Hearn, Mary Ann Hearn, James Anthony Hearn, John Frank Hearn, Richard John Hearn, Robert Anthony Jones, John G. John, Richard Norman Krammer (full amount), Jack Edward Krammer, Samuel Ralph Krammer, William James Krammer, Ralph Edward Krammer (full amount), Sam Thomas Krammer.

Psychology: Raymond L. Lonski, David LeRoy Lillick, Ray Michael Linsay, George Hamilton Marshall, Ronald Peter Matshavane, Howard Victor McDowell, William Patrick McHenry, Jr., Frank Donald Martin (fall semester), Kevin Daniel Murphy, Raymond Wilkes Mowry (fall semester), Joseph Edward Ochofack, Joseph John Patrick, Gary Francis Parker (spring semester), Theodore Bailey Pearson, John Joseph Poma, Rose James Poma, Ronald Rabinowitz-Garrison (fall semester), Herbert Roy Rappaport (fall semester), James Francis Reilly (spring semester), Ronald Howard Reiss, Edward Steven Rieck, Edward Charles Sakach, Irvine Salern, Robert Joseph Shale, William Edward Smythe, Michael Stanley Sommer, Lawrence William Spillman, Peter Joseph Stone, John Raymond Stunk, Robert Gerald Sutton, Robert Lawrence Swartz (fall semester), Jack Kenneth Tarr, James Herman Tarr, William Eugene Telsky, Myra Paul Thompson, William David Tison (junior), Roger Wilkeson Turner, Ann Vane, Gerald Wray Vane, Steven William Jones Dale Walsh, James Herman Webb (fall semester), William Richard Wells, Wesley Russell Wheeler, Herbert Duane Whittman, Vernon West Yatta, Richard Wayne Young (fall semester), Carl Eugene Zahski.

*The Towner Scholarship:* Charles Orla Johnson.

*The University Foreign Service Scholarship:* Marilyn Frances Hoffman.

*The William H. Walker Scholarship:* Homer John Furey.

*The John H. Whiting Scholarship:* Meredith Abigail Egan.

*The Zander Club Scholarship:* Beverly Buchanan Nicholas.

## PRIZES

1957-58

*Alpha Chi Sigma Freshman Award in Chemistry:* James Wallace Byers, Jr., Donald Wallace McClure, Lawrence Kuhn.

*Alpha Chi Sigma Senior Award in Chemistry:* Ronald Hawk.

*Alpha Delta Pi Award in Scholarship and Leadership:* Mary Elizabeth Hoffman.

*Alpha Kappa Psi Award in Commerce:* Edwin Abraham Tomashoff.

*Alpha Zeta Omega Award in Pharmacy:* Anne Segun.

*American Institute of Chemistry Award in Chemistry:* Ronald Hawk.

*Burns Pharrall Burns Award in Organic Chemistry:* Anne Donald Magill.

*Martin J. Cannon Memorial Award in Pharmacy:* Laura Albert Gaudin.

*Gilchrist Award in Social Science:* Jerry Marie Gray.

*John Henry Gaudin Award in Geomorphology:* Edwin Abraham Tomashoff, Irvine Salern.

*Duffett-Croft-Crossland Award for an essay on drama or the theater:* Margaret Patricia Rames.

*J. K. Carter Award in English:* Wale McCracken Almon.

*Dean Dyer Award in Public Speaking:* Eugene Jack Luchow, Jordan James Conrad Graves Taylor.

*Delta Gamma Award for scholarship, extracurricular activities, and service to the University:* Janet Zula Jaffe.

*Delta Zeta Award in Zoology:* Robert Martin Wilson.

*Elsworth Award in Public Law:* Joel Steinman.

*Eliot Award in Greek:* Robert Francis Olson.

*John Frederick Dwyer Award for that student who has given evidence of true citizenship and ability in "straight reporting" in student publications:* Elizabeth Price Evans.

*Judith Lewis III Memorial Award to that man in the graduating class who has demonstrated his moral values in the social and political arena and who has given evidence of his interpretation of that which is good and beautiful in his fellow men:* Eugene Jack Luchow.

*Walter L. Park Memorial Award in Chemistry:* Alan Dunn, [Midd]  
*Charles Glaser Award in that division in the Law School* who has received the  
 highest average grade in the third year, and two years. Harold Esch, [Middle]  
*John Dugan Goodrich Award in American Literature:* Delores Ann Brown  
*Edward Goodrich Award in French:* Patricia Anne Grady  
*James D. Goodrich Award in Pharmacy:* Marion Celia Minton  
*Maryon R. Goodrich Award in Commerce:* Ernie Abraham Thomas  
*Katherine Goodrich Award in English:* Naomi Victoria Smith  
*John Red Lobster Award in that division of the graduating class of the Law*  
 School, who has highest average in studies. Carrol Jean Collins  
*Maryn Miller Award in Mayfield French:* Davis Dudgey  
*Margaret R. Miller Award in the women students in the Southern Cross School* is  
 a student studying at Rose High and the most outstanding student in attendance  
 [Midd] [Middle]  
*John S. Miller Award in Orthodontic Surgery:* George Miller  
*Thomas D. Miller Award in that division of the senior class who, throughout*  
 his career, has done the most constructive work in student activities.  
 [Midd] [Middle]  
*John D. Miller Award:*  
 [Midd] [Middle]  
*John D. Miller Award in Medicine:* Owen Wayne Dancy  
*John D. Miller Award in Teacher Education:* Michael Scott Galloway, Caroline Allen Martin  
*Phy. D. Miller Award in Teacher Education:* Donald David Smith  
*Phy. D. Miller Award in the department of the student studying the subject of*  
 [Midd] [Middle]  
*Phy. D. Miller Award in the department of the student studying the subject of*  
 [Midd] [Middle]  
*Phy. D. Miller Award in that division of the Senior Class who, throughout his*  
 career, has done the most in promoting student activities. [Midd] [Middle]  
*Phy. D. Miller Award in Teacher Education:* Sidney Davis, [Midd]  
*Phy. D. Miller Award in Teacher Education:* Samuel Wainwright Anderson, Thomas Collins  
 [Midd] [Middle]  
*Phy. D. Miller Award in Chemistry:* Michael Wayne Day  
*Phy. D. Miller Award in Law:* Harold Esch, [Midd]  
 [Midd] [Middle]  
*Phy. D. Miller Award in French:* Patricia Anne Grady  
*Phy. D. Miller Award in Pharmacy:* Marion Celia Minton  
*Phy. D. Miller Award in Commerce:* Ernie Abraham Thomas  
*Phy. D. Miller Award in English:* Naomi Victoria Smith  
 [Midd] [Middle]

## JUDITH ASQUITH

JUNE 1, 1986 TO JUNE 1, 1987

[illegible]



- Chemistry:* Samuel Herbert Brown, Howard Myers Cook, Paul William Farnsworth, D. Bennett Allen, Herbert S. Johnson, Fred K. Kuhl, Irene Adams Kitchin, Charles Paul Loring, Harry Dean McCann, Jr., Edward Leonard M. Long, James Herbert O'Mara, Nancy Lee Parker, Roger Lee Spence, Thomas Russell Wynn.
- Civil Engineering:* Percy Henry Arthur (B.S.), Mary Katherine Brown, Sam Robert Johnson, William Charles Kuntzick, Ronald James Kuntzick, Vladimir Vladimirovich Saha, Sandra Lee Smith.
- Drama:* Arthur Lee Jackson, Ray.
- English:* Kathleen Catherine Muller, James Marie Gary, Anne Page Griffin, Theresa Gale Moore, Sally Vaughan Price.
- Education:* Gary Gordon Bowers (A.B. in Ed.), Barbara Edith Wilson (B.S.).
- Electrical Engineering:* John Paul Bassman, Roy John Baskin, John Grimsby (M.S.), James Anthony Gutzwiller, Anthony Thomas Latta, Nancy Frances Jones Morrison, Francis Dean McLennan (B.S.), David Courtney Rife (B.E.).
- Engineering Administration:* Mary Ann DeVries, Janet Laura Powers.
- English:* Susan Marie Bingham, Sylvia Dawn Freeman, Michael David Fox, Frances Marie Scott, Nancy Jordan White.
- Geography:* Alison Wilkey (B.S.), Kathleen Marie Stodd (B.S.).
- Geology:* John Carl Jones.
- History:* David William Miller, Michael Ray Mills, Sandra Lee Myers (A.B.), Lucy Michael Reinhold, Jane Elizabeth Ross, Irene Robinson, Eric Edward Updegr, Jr.
- Journalism:* Carolyn Lee Quinn.
- Law:* Charles Allen Helle (A.B.), William Robert Ludy (B.S.), David McLean (A.B.), Harold Thomas Moore (B.S.), John Christian Wain (A.B.).
- Mathematics:* Warren Allen Dacht.
- Mechanical Engineering:* Wynn Winfield Brown, Jr., Albert Earl Arnold Palmer, David Andrew Lewis, Eugene Wynn.
- Pharmacy:* Martha Lucy, Patrick Edward McCulloch, Irene Carl Rasmussen.
- Philosophy:* Matthew Philip Perlin (A.B.).
- Physical Education:* Joe Mox, Eugene George Bryant, William Frederick Corbett, Robert Joseph Frick, Andrew Charles Rubin, Jr., Ellen Robin Tait, Anne Helen Paul Lee Stearns (A.B.), James Ross Swearingen.
- Physics:* Donald Winfield George Heston, Harold Duane Heston, Francis Merrill Peters, Martin Christopher Radloff, William Wessling Wynn.
- Political Science:* Walter Donald Helen (A.B.), William Guyon Clark (A.B.), Andrew Worthy Elliot (A.M.), Thomas Paul Johnson, John Milton Knight (A.M.), David Maria Packer (A.B.), Helen C. McKee, Kenneth Naylor Jones, Jr.
- Psychology:* Michael Edward Brown, Paul Brown (M.S.), Barbara Ann Griffin, Suzanne Louise Marklin (A.B.), Maureen Le Miller, Carol Bradford New, Alan Allen Oren, Christopher Quinn (A.B.), Elizabeth Laura Steiner, Barbara Ann Vance, Lucetta Anna Young.
- Romance Languages:* Claire Therese Planch.
- Sociology:* Virginia Anne Bowers, Ann Katherine LeBlanc, Margaret.
- Spanish:* James San Alexander, Eugene Smiling Brown, John Collins Taylor, Jack Louther, James Ross Swearingen.
- Statistics:* Brenda Jane Alexander, Jerry Warren Colburn, Lawrence Daniel Latta, Howard Richard Schreyer (M.S.), Jack Samuel Shaw (A.B.), Ann Marie Soper (B.S.), Raymond Edward Thomas (A.B.).
- Zoology:* George Frederick Corbett, Ronald Gordon Latta, Ann Naomi Miller, Jay Howard Miller, Jr., Deborah Abbe Rouse, Alan Marie Rouse, Lisa Gilbert Shaw, William Frederick Thompson, James Chas. Fox.



## STUDENTS REGISTERED

SUMMER SESSION 1:

FALL AND SPRING SEMESTERS 1995

[illegible]











### Students Registered

525

[illegible]

Baker, Benjamin Harrison	MI.	Ballard, Jennings Fletcher	MI.
B.S. 1912, University of Maryland		A.B. 1927, East Carolina Teachers	
Baker, Bruce LeRoy	D.C.	College	
Baker, Berry Edmunds	D.C.	A.M. 1927, Columbia University	
Baker, Cecil Lee	Va.	Biology	D.C.
Baker, Donald Rulon	Calif.	Baker, William Fair	Va.
Baker, Edward Lester	MI.	Baltimore, Hopkins Ketter	Texas
Baker, Edward Webb	MI.	A.B. 1927, Texas Western College	
A.B. 1912, A.M. 1913, Ed. 1915,		Baltimore, Wilfrid Jerome	D.C.
The George Washington University		P.H.D. 1921, Yale University	
Baker, Fritz E. Gulbeth	Calif.	Education, Florida State	B.
Baker, Harold Lamm	Texas	B.S. 1928, 1929, Georgetown	
Baker, Henry Eugene	MI.	University	
Baker, James Luckaker	MI.	Baldwin, Ohio	D.C.
B.S. 1929, University of Maryland		Baltimore, Maryland	D.C.
Baker, Jerome Curren	Va.	History, Vermont History	D.C.
Baker, Marshall	R.I.	A.B. 1927, University of Maryland	
Baker, Marshall	Va.	A.B. 1924, The George Washington	
Baker, Michael Steven	D.C.	University	
Baker, Milton Warner	Pa.	Baker, Elmer	B.
A.M. 1910, Lebanon Valley College		Biology, National of Rio de	D.C.
Baker, Raymond Nicholas	D.C.	Baltimore, George H.	D.C.
B.S. 1920, U.S. Naval Academy		A.B. 1921, Harvard University	
Baker, Robert Edward	D.C.	A.M. 1921, New York University	
B.S. 1918, New York State		Baker, Arthur Edmund	MI.
Teachers College, Buffalo		Certificate of Law 1920, Latvia Law	
A.M. 1922, Catholic University of		School	
America		Baker, James Joseph	N.Y.
Baker, Ruth A. Long	Va.	B.S. 1921, Va.	N.Y.
Baker, Stuart John	Va.	Baltimore, Parker's Webster, Jr.	
Baker, Terry Mae	MI.	A.B. 1929, Princeton University	
B.S. 1924, Purdue University		Baker, Madeline Louise	Pa.
Baker, Walter Lee	Va.	Baker, William Landon	MI.
Baker, Ward Charles	MI.	A.B. 1924, Princeton University	Va.
Baker, William	D.C.	Baker, John Albert	Va.
Baker, William Christon	D.C.	Baker, Leonard Gavin	Va.
A.B. 1922, A.M. 1923, The George		Baker, Andrew	MI.
Washington University		Baker, Walter Charles	
Baker, Stanley Michael	Pa.	B.S. 1927, University of Denver	D.C.
Baker, S. M. Roberts	MI.	Baker, Arthur Spencer	
Balady, Elizabeth	Va.	A.B. 1921, Cornell University	
A.B. 1927, A.M. 1927, M.D. 1927,		A.M. 1921, The George Washington	
Rural Homeopathic University		University	
Bald, Elsie Vernon	MI.	Baker, Guy Frank	Va.
A.B. 1927, Maryland State University		Baker, Isaac M.	D.C.
Baldwin, Herbert Ann	Va.	B.S. 1920, Agricultural and Technical	
Baldwin, James	D.C.	College of North Carolina	D.C.
Baldwin, Bernard Elwyn	MI.	Baker, Norman Nash	
Baldwin, Brian Jay	MI.	B.S. 1920, Bennett College	
Baldwin, David	D.C.	A.M. 1920, Columbia University	Va.
Baldwin, Elmer Eugene	MI.	Baker, Philip Jerome	
A.B. 1927, Miami University		Baker, Victor Christian University	Va.
Baldwin, Omar Franklin	Pa.	Baker, Victor Eugene, Jr.	D.C.
A.B. 1920, University of Florida		Baker, William Eugene	
Baldwin, Alexander J.	Va.	A.B. 1928, Howard University	N.Y.
B.S. 1920, B.A. 1921, University of		Baker, Marvin Lee	
Pittsburgh		B.S. 1921, New York State Teachers	
Baldwin, Robert Wade	MI.	College, Cleveland	D.C.
Bald, Dorothy Lee	W.Va.	Baker, Joseph Henry, Jr.	Va.
Bald, Randall Donald	N.Y.	Baltimore, Robert Reed	Calif.
Baldwin, Thomas	Ind.	Baker, John Victor	
A.B. 1921, University of Notre Dame		B.S. 1920, Kansas State College	MI.
Ball, Beverly Jackson	Va.	Bald, Raymond Lee	
Ball, John Cecil	Pa.	B.S. 1927, University of	
Ball, Joseph James	MI.	Randolph	D.C.
Baldwin, Nelson Brooks	MI.	Baker, James Albert Megrid	D.C.
A.B. 1920, 1921, 1922, Virginia		Baker, James Campbell	Mass.
Politechnic Institute		Baker, William Harold	D.C.
Baldwin, Donald Eugene	Ark.	B.S. 1920, Newark University	MI.
B.S. 1920, 1921, University of		Baker, Warren Eugene	
Arkansas		Baker, Frank Gustaf	
		A.B. 1924, Mississippi Southern	
		College	

Baker, James Lewis	I.C.	Bassett, Rose Faye	D.C.
Baker, Lewis	I.C.	Bassett, Arnold Benjamin	D.C.
Baker, William August	S.C.	Bassett, A. J. 1934, The George Washington	
Baker, William E.	S.C.	Compendium	
Baker, George S.	Texas	Bass, Charles Hubert	Pa.
Baker, George 1937, Mississippi State College		B.B. 1934, Ohio University	
Baker, George Edgar	I.C.	Bass, Mark Ann	Pa.
Baker, George Edgar	M.	Bass, William McKague, Jr.	Pa.
B.A. 1931, Miami University, Oxford		Bass, Robert Johnston	Miss.
B.A. 1931, Miami University, Oxford		A.B. 1931, Louisiana Institute of	
Baker, Paul William	I.C.	Technology	
B.A. 1931, U.S. Naval Academy		Bass, Vera Anna	D.C.
B.A. 1931, Massachusetts Institute of		Bassinger, John Paul	M.
Technology		Bassett, Alice Mae	M.
A.B. 1937, Western Reserve University	D.C.	B.B. 1934, Pennsylvania State Teachers	
A.M. 1938, U.S.		College, Pennsylvania	
Baker, Thomas H.	Va.	A.M. 1938, U.S. The College of	
A.B. 1931, University of		Washington, University	
D.D. 1931, The George Washington		Bassett, Elizabeth Blair	Tia
University		A.B. 1931, Central College	
Baker, Thomas Henry	Va.	Bassett, John Cleveland	M.
A.B. 1931, The George Washington		Bassett, John William	D.C.
University		Bassett, Marie	M.
Baker, Thomas Henry	Va.	Bassett, William Herbert	D.C.
A.B. 1931, The George Washington		Bassett, Donald Michael	D.C.
University		Bassett, Adam William, Jr.	Miss.
Baker, Thomas Henry	Va.	A.B. 1931, Maryland College	
A.B. 1931, The George Washington		College, Baltimore, Maryland	
University		Bassett, William Randolph	M.
Baker, Thomas Henry	Va.	Bassett, William Randolph	Va.
A.B. 1931, The George Washington		Bassett, William Randolph	D.C.
University		A.B. 1931, Frederick College of the	
Baker, Thomas Henry	Va.	College, Md.	
A.B. 1931, The George Washington		Bassett, William Randolph	M.
University		A.B. 1931, Johns Hopkins University	
Baker, Thomas Henry	Va.	Bassett, William Randolph	M.
A.B. 1931, The George Washington		Bassett, William Randolph	Va.
University		Bassett, William Randolph	D.C.
Baker, Thomas Henry	Va.	Bassett, William Randolph	Texas
A.B. 1931, The George Washington		Bassett, William Randolph	Va.
University		Bassett, William Randolph	Va.
Baker, Thomas Henry	Va.	Bassett, William Randolph	Va.
A.B. 1931, The George Washington		Bassett, William Randolph	Va.
University		Bassett, William Randolph	Va.
Baker, Thomas Henry	Va.	Bassett, William Randolph	Va.
A.B. 1931, The George Washington		Bassett, William Randolph	Va.
University		Bassett, William Randolph	Va.
Baker, Thomas Henry	Va.	Bassett, William Randolph	Va.
A.B. 1931, The George Washington		Bassett, William Randolph	Va.
University		Bassett, William Randolph	Va.
Baker, Thomas Henry	Va.	Bassett, William Randolph	Va.
A.B. 1931, The George Washington		Bassett, William Randolph	Va.
University		Bassett, William Randolph	Va.
Baker, Thomas Henry	Va.	Bassett, William Randolph	Va.
A.B. 1931, The George Washington		Bassett, William Randolph	Va.
University		Bassett, William Randolph	Va.
Baker, Thomas Henry	Va.	Bassett, William Randolph	Va.
A.B. 1931, The George Washington		Bassett, William Randolph	Va.
University		Bassett, William Randolph	Va.
Baker, Thomas Henry	Va.	Bassett, William Randolph	Va.
A.B. 1931, The George Washington		Bassett, William Randolph	Va.
University		Bassett, William Randolph	Va.
Baker, Thomas Henry	Va.	Bassett, William Randolph	Va.
A.B. 1931, The George Washington		Bassett, William Randolph	Va.
University		Bassett, William Randolph	Va.
Baker, Thomas Henry	Va.	Bassett, William Randolph	Va.
A.B. 1931, The George Washington		Bassett, William Randolph	Va.
University		Bassett, William Randolph	Va.
Baker, Thomas Henry	Va.	Bassett, William Randolph	Va.
A.B. 1931, The George Washington		Bassett, William Randolph	Va.
University		Bassett, William Randolph	Va.
Baker, Thomas Henry	Va.	Bassett, William Randolph	Va.
A.B. 1931, The George Washington		Bassett, William Randolph	Va.
University		Bassett, William Randolph	Va.
Baker, Thomas Henry	Va.	Bassett, William Randolph	Va.
A.B. 1931, The George Washington		Bassett, William Randolph	Va.
University		Bassett, William Randolph	Va.
Baker, Thomas Henry	Va.	Bassett, William Randolph	Va.
A.B. 1931, The George Washington		Bassett, William Randolph	Va.
University		Bassett, William Randolph	Va.
Baker, Thomas Henry	Va.	Bassett, William Randolph	Va.
A.B. 1931, The George Washington		Bassett, William Randolph	Va.
University		Bassett, William Randolph	Va.
Baker, Thomas Henry	Va.	Bassett, William Randolph	Va.
A.B. 1931, The George Washington		Bassett, William Randolph	Va.
University		Bassett, William Randolph	Va.
Baker, Thomas Henry	Va.	Bassett, William Randolph	Va.
A.B. 1931, The George Washington		Bassett, William Randolph	Va.
University		Bassett, William Randolph	Va.
Baker, Thomas Henry	Va.	Bassett, William Randolph	Va.
A.B. 1931, The George Washington		Bassett, William Randolph	Va.
University		Bassett, William Randolph	Va.
Baker, Thomas Henry	Va.	Bassett, William Randolph	Va.
A.B. 1931, The George Washington		Bassett, William Randolph	Va.
University		Bassett, William Randolph	Va.
Baker, Thomas Henry	Va.	Bassett, William Randolph	Va.
A			









Benson, Harold	Va.	Benson, Eugene Latta	Va.
Benson, Helen Lee	D.C.	B.E. 1940, Ohio State University	
Benson, Joan Ann	D.C.	H.B. 1941, The George Washington University	
B.E. 1911, Oregon Young University		Benson, John Young, Jr.	Va.
Benson, Virginia Paul	D.C.	A.B. 1941, University of Georgia	
Benson, William Paul	D.C.	B.E. 1941, Columbia University	
A.B. 1941, M.E.A. 1942, The George Washington University		Benson, John T., Jr.	Me.
Benson, William Lewis	D.C.	Benson, Marvin	Va.
B.E. 1942, U. S. Naval Academy		Benson, George Lambert	Va.
Benson, Barbara Louise	Wyo.	A.B. 1941, University of Minnesota	
A.B. 1942, Minnesota University College		M.E. 1942, New York University	
Benson, Herbert R.	Kan.	Bentley, Herbert Nelson	N.Y.
P.E. 1911, A.M. 1914, University of Kansas		B.E. 1941, Cornell University	
Benson, George Leslie	Wash.	Bentley, John Sterling	Pa.
Benson, Tom Connor, Jr.	Va.	Bentley, John Franklin	Me.
Benson, Frank Ann	Pa.	Bentley, William Franklin	D.C.
Berry, Arthur Henry	D.C.	Bentley, Virginia	Ind.
B.E. 1936, State University of Iowa		B.E. 1936, Iowa State Agricultural College	
Berry, Donald Frank	Cal.	Bentley, William Charles	Me.
Benson, Allen	Me.	B.E. 1941, University of Oregon	
B.E. 1941, 1942, Catholic University of America		Bentley, Alex Madison	Pa.
Bentley, Leona Mauer	D.C.	B.E. 1941, 1942, Cornell University	
B.E. 1941, D.B. 1942, Harvard University		Bentley, John Henry	Va.
Berg, Gordon Howard	Cal.	A.B. 1941, Harvard College	
B.E. 1941, University of Southern California		M.F.A. 1941, New York University	
Berg, Myron	D.C.	Bentley, Leslie Bernard	D.C.
Berg, Robert Leonard	Pa.	Bentley, Morton	D.C.
B.E. 1941, U. S. Naval Academy		A.B. 1941, Pennsylvania State University	
Berg, Robert William	Tenn.	Bentley, Paul	D.C.
B.E. 1941, F.B. 1942, Georgetown University		Bentley, Stuart Paul	D.C.
Bergin, Harold Thomas	Wash.	B.E. 1941, New York University	N.Y.
Benson, Max Burton	Me.	Bentley, Victor	Pa.
Benson, Sam	D.C.	Bentley, Miss Abby	Me.
A.B. 1941, University of Iowa		A.B. 1941, Belknap College	
A.M. 1941, Iowa University		A.M. 1941, Cornell University	
Benson, Elmer Monroe	D.C.	Berry, Charles Wayne, Jr.	Pa.
Berry, Phyllis Eugene	Pa.	B.E. 1941, New York University	
A.B. 1941, The George Washington University		Berry, David Raymond	Va.
Berry, Larry Joseph	D.C.	Berry, Ralph Henry	Va.
Berry, Leonard	N.Y.	Berry, John Leonard	Me.
B.E. 1941, Cornell College		B.E. 1941, University of Pennsylvania	
Berry, Philip Kenneth	Pa.	Berry, Richard Martin	Cal.
Berry, Herbert Elmer	D.C.	Berry, Richard Marshall	Va.
Berry, David John	Cal.	Berry, Robert Allen	Me.
Berry, Elmer Joseph	N.Y.	Berry, Samuel	Ind.
Berry, Kenneth Raymond	Va.	Berry, William	
A.B. 1941, A.M. 1944, The George Washington University		B.E. 1941, S. M. 1944, Andrews University	
Benson, John Franklin, Jr.	Me.	A.M. 1941, 1942, The George Washington University	
Berry, Gerald H.	N.Y.	Berry, William John	Pa.
B.E. 1941, College of the City of New York		Berry, Roy Lee	D.C.
Berlin, Henry Louis	Me.	A.B. 1941, The George Washington University	
B.E. 1941, University of Maryland		Berry, Herbert	D.C.
Bell, Pauline	N.Y.	Berlin, John Blake	Cal.
Bell, John Jack	D.C.	B.E. 1941, Cal. Poly. 1948, University of Western Ontario	
A.B. 1941, The George Washington University		Berlin, Jonathan I.	D.C.
Benson, David Aaron	D.C.	A.B. 1941, Cornell College	
Benson, Jane Frances	D.C.	Berlin, Frank Henry	Va.
Benson, Robert George	Va.	A.B. 1941, The George Washington University	
Benson, Charles Leonard	N.Y.	Berry, Glen A.	Me.
Berwick, Ann Jane	Pa.	B.E. 1941, U. S. Naval Academy	
Berry, Donald Ross	D.C.	Berry, Lee James	D.C.
Bertrand, Barbara Ann	Va.	A.B. 1941, Iowa University	

Rey, Robert Henry	Va	Rey, Joseph Marie	Va
R.E. 1932, F. Ohio, Indiana University		Rice, William Henry	N.Y.
Rice, Norman Ray	D.C.	R.I. 1932, University of Notre Dame	
Ridgeway, Harold Anne	D.C.	Ridgeway, Barbara Howard	Va
Ridgeway, Mary	D.C.	Ridgeway, Joseph Milton	D.C.
M.S. 1931, New School of Social Work		Ridgeway, James Herbert	MA
Rider, Peter D.	W.Va.	Ridgeway, Pauline	D.C.
A.B. 1932, West Virginia University		R.I. 1932, Wheaton College	
R.I.B. 1932, National University		Rider, Daniel Mingo	Va
Ridder, Howard Vance	Va	A.B. 1934, The George Washington	
Ridder, Richard Walter	Va	University	
Ridder, Thomas R.	D.C.	Ridder, Theodore Franklin	Va
Ridder, Robert Elaine	Va	Ridder, Samuel Martin	MA
Ridder, David Sawyer	Va	R.I. 1932, University of Wisconsin	
Ridder, Ernest Albert, Jr.	Va	Ridder, Christine Elizabeth	MA
R.I. 1932, Northwestern University		Ridder, Mary Louise	D.C.
Ridder, Richard Albert	MA	Ridder, Howard James	Va
R.I. 1932, College of the City of		A.B. 1932, The George Washington	
New York		University	
Ridder, Catherine Richard	D.C.	Ridder, Gary Herbert	D.C.
Ridder, Carolyn Louise	D.C.	A.B. 1932, Wheaton College	
Ridder, Nancy Louise	Va	Ridgeway, Harold LaNore	Pa
Ridder, John Vayne Peter	D.C.	Ridgeway, John	D.C.
Ridder, Philip Lee	D.C.	Ridder, Virginia Anne	D.C.
Ridder, William Robert	MA	Ridder, Joseph	D.C.
Ridder, George Edward	D.C.	R.I. 1931, Ricks College	
Ridder, Joseph R.	D.C.	Ridder, Victor May	Va
Ridder, Paulina H.C. P.	Va	Ridder, Mary Gerald	D.C.
R.I. 1932, University of		Ridder, Donald Lee	MA
Illinois		R.I. 1932, College of Charleston	
Ridder, James Ernest	MA	R.I. 1932, U.S. Naval Academy	
Ridder, Edward	Va	Ridder, Henry Marshall	MA
R.I. 1932, U.S. Naval Academy		Ridder, James Henry	N.Y.
Ridder, Louis A. Louis	Va	Ridder, John Woodruff	MA
R.I. 1932, Ohio University		A.P. 1932, University of Wisconsin	
Ridder, Henry James	MA	A.M. 1932, Central University	
A.B. 1932, University of Maryland		Ridder, Patricia Wooten	D.C.
Ridder, Anne Louise, Jr.	D.C.	A.B. 1932, South College	
Ridgeway, Ronald Walter	MA	Ridder, Arthur Lee	Pa
Ridder, David Eugene	MA	Ridder, Joseph Jack	MA
Ridder, Henry Wade	D.C.	R.I. 1932, University of	
Ridder, Philip Thomas	D.C.	Illinois	
Ridder, John William	D.C.	Ridgeway, Charles Reed	Pa
Ridder, Robert J.	D.C.	A.B. 1932, Virginia Southern College	
Ridder, Anne	D.C.	Ridgeway, Eva Katherine	D.C.
A.B. 1932, B.S. 1932, Ohio State		Ridgeway, Emma Frost	D.C.
University		Ridgeway, Virginia Lee	D.C.
Ridder, Howard Kenneth	MA	R.I. 1932, American University	
Ridder, Lucinda E. P.	MA	M.S. 1932, The George Washington	
Ridder, Donald Louis	Va	University	
I.C. 1931, University of Colorado		Ridgeway, John Ross	MA
J.I. 1931, M. 1932, The George		R.I. 1932, University of Missouri	
Washington University		Ridgeway, Frank T.	D.C.
Ridder, James Herbert	Va	Ridgeway, Robert Reynolds, Jr.	Va
Ridder, Virginia	D.C.	Ridgeway, Thomas Edward	Va
I.L.B. 1932, University of Salomka		A.B. 1932, Eastern College	
College		Ridgeway, William Joseph, Jr.	Va
Ridder, Corinna	D.C.	Ridgeway, Theodore	D.C.
Ridder, Mary	D.C.	R.I. 1932, University of	
Ridgeway, Edgar Leopold	MA	Illinois	
Ridder, Yvonne M.	D.C.	Ridgeway, Robert John	Va
Ridder, Martin L. Lyntie	Va	A.B. 1932, L.B. 1932, Cornell	
A.B. 1932, The George Washington		University	
University		Ridder, William Robert	MA
Ridgeway, Charles Francis	Wa	Ridder, Charles Thomas	Va
B.B.A. 1932, M.B.A. 1932, University		Ridder, Charles Oliver	Va
of Wisconsin		A.B. 1932, The George Washington	
Ridgeway, Margaret Lee	D.C.	University	
A.P. 1932, College of Emporia		Ridder, Charles Robert	MA
Ridgeway, Samuel David, Jr.	MA	B.A. 1932, The George Washington	
A.P. 1932, College of Emporia		University	
Ridder, David	MA	Ridder, Neil Albert	Va
Ridder, Christopher	D.C.		
A.B. 1932, Harvard University			



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Bowman, Homer Monroe	Mo	Bowen, Emily Kinnick	D.C.
B.S. in P.E. 1915, University of Missouri		State, Iowa	D.C.
Bowman, Raymond L.	D.C.	Bowen, Carl Lester	Va
Bayer, Gordon Douglas	Mo	Bowman, John Nicholas	D.C.
B.B.A. 1942, The George Washington		Bowen, Thomas	D.C.
University		A.B. 1941, The George Washington	
Bowd, Robert William	D.C.	University	
B.S. 1935, Mount Telemachus College		Bowen, Elmer Mott	D.C.
A.M. 1938, Catholic University of		A.B. 1931, University of South Carolina	
America		Bowen, Louis Agnes	D.C.
Bow, William Cornelius	D.C.	B.S. 1935, Mount Telemachus College	
B.S. 1918, Mount Telemachus College		Bowen, William Charles L.	D.C.
Bowdoin, Clarence Elmer	Ohio	A.B. 1915, Mount Telemachus College	
Bowdoin, Ernest Cleveland, Jr.	D.C.	Bowen, Eugene Thomas	Calif.
Bow, Anna Caroline	Va	Bowdoin, Eugene Thomas	Mo
Bow, Harold and Fannie	Mo	Bowen, Arthur Eugene	Mo
Bach, Louis Joseph	D.C.	Bowen, Robert Eugene	Va
A.B. 1926, Tulane University		Bowen, Robert Eugene	Va
B.S. 1929, U. S. Merchant Marine		Bowen, Robert Eugene	Mo
Academy		B.S. in M.E. 1925, Iowa State College	
Bow, Albert Louis	Pa	of Agriculture and Mechanical Arts	
Bow, Robert York	Va	Bowen, Arthur Eugene	Va
A.B. 1925, Tulane University		B.S.E. 1918, Georgia Institute of	
Bowen, Philip John	Mo	Technology	
D.M.D. 1925, Tulane College		Bowen, Eugene Thomas	Va
Bowen, Joseph Riley	Va	Bowen, Eugene Thomas	D.C.
B.S. 1912, Georgia Institute of		B.S. 1914, Oklahoma Agricultural and	
Technology		Mechanical College	
Bowen, Robert Bruce	Pa	Bowen, Arthur Eugene	Mo
Bowen, David Charles	D.C.	A.B. 1915, University of North Carolina	
A.P. 1911, The George Washington		A.M. 1917, Rutgers College	
University		Bowen, John Brumley	Va
Bowen, Harold DeForest	Mo	B.S. 1911, Mount Telemachus College	
B.S. in P.A. 1925, University of		A.M. in Ed. 1915, The George	
Florida		Washington University	
Bowen, Clara Marie	D.C.	Bowen, Mark Thomas	Calif.
Bowling, Murray Woodward	D.C.	Bowen, Gerald Herbert	Mo
B.S. 1911, University of Maryland		Bowen, Eugene W.	
Bowling, Anna Lee	Va	B.S. 1911, University of Missouri	D.
Bowling, David Quentin	D.C.	Bowling, John Ray	Mo
Bowling, Earl Ray	Va	Bowen, Eugene Thomas	Va
Bowling, Ernest Russell, Jr.	Va	Bowen, Eugene Thomas	Va
Bowling, James Hale	D.C.	A.B. 1911, University of Denver	
Bowling, William Hattie	Mo	Bowen, George John F.	
A.B. 1918, University of Pennsylvania		A.P. 1915, University of Missouri	
A.M. 1920, Bryn Mawr College		M.B.A. 1922, The George Washington	
Bowling, George Simmons	Va	University	
Bowling, John Paul	Tenn	Bowen, Richard John	N.Y.
B.S. 1911, University of Oklahoma		A.B. 1911, Bryn Mawr College	
Bowling, John Thomas	Va	Bowen, William James	Va
B.S. in E.E. 1915, Worcester		Bowen, William James	Va
Polytechnic Institute		Bowen, William James	
Bowling, William Adelaide	D.C.	B.S. 1911, North Carolina State	
Bowling, Edward Lee	Calif.	Teachers College, Raleigh City	
A.P. 1911, Louisiana University of Law		Bowen, Edmund M. Paul	D.C.
and Commerce		Bowen, Edmund M. Paul	Va
Bowling, Elmer Gordon	D.C.	Bowen, Edmund M. Paul	D.C.
B.S. 1915, Mount Telemachus College		Bowen, Edmund M. Paul	D.C.
Bowling, Gerald Thomas	Mo	Bowen, Edmund M. Paul	D.C.
Bowling, James Oliver	Va	Bowen, Edmund M. Paul	D.C.
A.B. 1911, Niagara University		Bowen, Edmund M. Paul	D.C.
Bowling, James Monroe	Philippines	Bowen, Edmund M. Paul	D.C.
Bowling, Frank Brown	N.Y.	Bowen, Edmund M. Paul	D.C.
A.B. 1911, University of Rochester		Bowen, Edmund M. Paul	D.C.
Bowling, Mary Catherine, Jr.	D.C.	Bowen, Edmund M. Paul	D.C.
A.P. 1915, Mount Telemachus College		Bowen, Edmund M. Paul	D.C.
A.M. 1917, Cambridge University,		Bowen, Edmund M. Paul	D.C.
England		Bowen, Edmund M. Paul	D.C.
Bowling, Frank John	D.C.	Bowen, Edmund M. Paul	D.C.
Bowling, Medical Student	N.C.	Bowen, Edmund M. Paul	D.C.
B.S. 1915, Wake Forest College		Bowen, Edmund M. Paul	D.C.
Bowling, Raymond	Va	Bowen, Edmund M. Paul	D.C.
A.B. 1915, Yale University		Bowen, Edmund M. Paul	D.C.





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Bash, John Foster	S.D.	Bash, Betty Jean	Va
B.S. 1942, South Dakota		Bash, John Henry, Jr.	Conn.
School of Mining and Technology		B.A. 1928, U.S. Coast Guard Academy	
Bash, Milton Manning, Jr.	Mss.	Bash, Albert Carl	Va
A.B. 1935, U.B. 1938, University of		Bash, Edward Everett	Va
Michigan		Bash, Robert Condit	W. Va.
Bash, Stephen E.	Va	Bash, Henry Ann	D.C.
A.B. 1931, Michigan State University		B.S. 1931, Denison College	
Bash, Edward James	N.Y.	Bash, Francis Madison	S.D.
Bash, Louis Frank	Md.	A.B. 1911, The George Washington	
Bash, Henry Frederick	Md.	University	
Bash, John Milton	D.C.	Bash, James Joseph	Va
Bash, Victor, 1934	D.C.	Bash, John Milton	D.C.
Bash, Carl John	D.C.	B.S. 1934, U.S. Coast Guard Academy	
B.S. 1934, The George		Bash, John Milton	Mss.
Washington University		Bash, Robert James	Md.
Bash, John	D.C.	B.S. 1934, U.S. Coast Guard Academy	
Bash, Nelson Andrew	D.C.	Bash, Alexander	H.C.
Bash, Charles Lee	D.C.	A.B. 1934, Ohio University	
Bash, William Lee	Md.	Bash, Joseph	D.C.
B.S. 1934, Harvard University		Bash, Joseph David	Va
Bash, John E.	D.C.		
A.B. 1938, Colorado State College			
Bash, James			
Bash, James Gordon	Va		
Bash, Joseph Lee	Go.	Chabot, Thomas Joseph, Jr.	Va
A.B. 1937, University of North		A.B. 1931, University	
Carolina		A.M. 1934, The George	
Bash, Margaret Newman	Calif.	Washington University	
A.B. 1934, A.M. 1938, University		Cable, Donald Albert	Va
of California		A.B. 1934, Lake Forest College	
Bash, Mary Jane	I.C.	Cable, John Joseph	Va
B.S. 1931, Niagara University		Cable, Margaret Richard	N.Y.
Bash, Nell	D.C.	Cable, John Michael	Philippines
B.S. 1931, Agriculture and Technical		Cable, Edward H.	Va
College of North Carolina		Cable, Robert Lee	Va
Bash, Robert Milton	D.C.	Cable, John Warren	Md.
Bash, Ross Della	Pa.	Cable, Alice Lee	Va
Bash, Fred G.	Pa.	Cable, Charles William	Conn.
Bash, Robert Ann	Md.	Cable, Charles Augustus	Va
Bash, William Henry	N.H.	A.B. 1934, Wesley College	
A.B. 1934, University of New		Cable, William Lee	Va
Hampshire		Cable, William Earl	Va
Bash, Frank Robert James	Va	Cable, Harry Albert	D.C.
A.B. 1934, Rutgers University		A.B. 1934, Manhattan College	
Bash, John	Calif.	Cable, John Joseph	Pa.
A.B. 1934, University of California		A.B. 1934, University of Pennsylvania	
M.S. 1934, California University		Cable, William George	Va
1934, Georgia Institute of		H.E.F. 1934, R.M.E. 1934, University	
Technology		of Maryland	
Bash, Charles Kneller	D.C.	Cannon, Louis Lee	Md.
Bash, Philip Allen	Va	A.B. 1934, The George Washington	
Bash, Lee Richard	Va	University	
Bash, William Indiana	D.C.	Care, John Lee	Md.
Bash, William	D.C.	Care, John Vernon, Jr.	Pa.
A.B. 1934, The George Washington		A.B. 1934, Dickinson Southern	
University		College	
Bash, Bruce Charles, Jr.	Va	Care, John Joseph	D.C.
A.P. 1937, Boston College		Care, William	Pa.
M.A. 1934, U.C.S. 1934, Harvard		La Jolla, University of California	
University		Care, John	D.C.
Bash, Wayne Holloway	D.C.	Care, Augustus Francis	Pa.
Bash, Robert Oliver	Va	A.B. 1934, Ohio Wesleyan	
Bash, William	Conn.	Care, John	
E.S. 1931, M.S. 1931, The George		Carroll, Albert	Columbia
Washington University		M.B. 1934, Naval Academy of	
Bash, John Stevens	Md.	California	
A.B. 1931, University of Virginia		Carroll, Oswald William	Va
Bash, Martin Revere	Md.	Carroll, Stanley Rome	Md.
A.B. 1931, Hamilton College of the		Carroll, Francis Mae	D.C.
United States		B.S. 1934, Mount Teachers College	
Bash, John North	D.C.	Carroll, Joseph Allen	S.C.
Byler, John Paul	Wx.	B.S. 1934, University of South	
		Carolina	









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Dr. L. L. Thibault		Dr. L. L. Thibault	
A.B. 1901, The College of William and Mary		B.S. 1904, U. S. Maritime Service	
Dr. L. L. Thibault		A.B. 1907, U. S. Maritime Service	
Dr. L. L. Thibault		B.S. 1910, U. S. Maritime Service	
Dr. L. L. Thibault		B.S. 1913, U. S. Maritime Service	
Dr. L. L. Thibault		B.S. 1916, U. S. Maritime Service	
Dr. L. L. Thibault		B.S. 1919, U. S. Maritime Service	
Dr. L. L. Thibault		B.S. 1922, U. S. Maritime Service	
Dr. L. L. Thibault		B.S. 1925, U. S. Maritime Service	
Dr. L. L. Thibault		B.S. 1928, U. S. Maritime Service	
Dr. L. L. Thibault		B.S. 1931, U. S. Maritime Service	
Dr. L. L. Thibault		B.S. 1934, U. S. Maritime Service	
Dr. L. L. Thibault		B.S. 1937, U. S. Maritime Service	
Dr. L. L. Thibault		B.S. 1940, U. S. Maritime Service	
Dr. L. L. Thibault		B.S. 1943, U. S. Maritime Service	
Dr. L. L. Thibault		B.S. 1946, U. S. Maritime Service	
Dr. L. L. Thibault		B.S. 1949, U. S. Maritime Service	
Dr. L. L. Thibault		B.S. 1952, U. S. Maritime Service	
Dr. L. L. Thibault		B.S. 1955, U. S. Maritime Service	
Dr. L. L. Thibault		B.S. 1958, U. S. Maritime Service	
Dr. L. L. Thibault		B.S. 1961, U. S. Maritime Service	
Dr. L. L. Thibault		B.S. 1964, U. S. Maritime Service	
Dr. L. L. Thibault		B.S. 1967, U. S. Maritime Service	
Dr. L. L. Thibault		B.S. 1970, U. S. Maritime Service	
Dr. L. L. Thibault		B.S. 1973, U. S. Maritime Service	
Dr. L. L. Thibault		B.S. 1976, U. S. Maritime Service	
Dr. L. L. Thibault		B.S. 1979, U. S. Maritime Service	
Dr. L. L. Thibault		B.S. 1982, U. S. Maritime Service	
Dr. L. L. Thibault		B.S. 1985, U. S. Maritime Service	
Dr. L. L. Thibault		B.S. 1988, U. S. Maritime Service	
Dr. L. L. Thibault		B.S. 1991, U. S. Maritime Service	
Dr. L. L. Thibault		B.S. 1994, U. S. Maritime Service	
Dr. L. L. Thibault		B.S. 1997, U. S. Maritime Service	
Dr. L. L. Thibault		B.S. 2000, U. S. Maritime Service	
Dr. L. L. Thibault		B.S. 2003, U. S. Maritime Service	
Dr. L. L. Thibault		B.S. 2006, U. S. Maritime Service	
Dr. L. L. Thibault		B.S. 2009, U. S. Maritime Service	
Dr. L. L. Thibault		B.S. 2012, U. S. Maritime Service	
Dr. L. L. Thibault		B.S. 2015, U. S. Maritime Service	
Dr. L. L. Thibault		B.S. 2018, U. S. Maritime Service	
Dr. L. L. Thibault		B.S. 2021, U. S. Maritime Service	
Dr. L. L. Thibault		B.S. 2024, U. S. Maritime Service	

De Tross, Marlon William	MI	Dickerson, Ray	D.C.
A.B. 1911, University of Michigan		A.B. 1906, The George Washington	
Detweiler, Charles Robert	Va	University	
Detweiler, Harry Geddie	Pa	Dickson, John Charles	Va
B.S. 1906, Pennsylvania State Teachers		Dickson, Frederick Averb	D.C.
College, West Chester		A.B. 1901, University of Nevada	
A.M. 1911, The George Washington		Dickson, Helen Thomas	Va
University		Dickson, John Levan	Ohio
Dickley, Frederick Lee	Va	Dickson, Mary Ann	N
B.S. 1901, Ohio State University		B.S. in Com. 1910, Rhode College	
Dickmeyer, James Howard	D.C.	Dickson, William Graham	Va
Dwyer, Thomas Arthur	D.C.	Dickson, William	N.Y.
A.B. 1910, The George Washington		A.B. 1911, New York State College	
University		for Teachers	
Dwyer, William Joseph	Va	Diddle, Gerald Frederick	MI
B.E. 1910, The Johns Hopkins		B.S. in E.E. 1909, University of	
University		Virginia	
Dwyer, Charles Jr.	MI	Dietrich, Robert Edgar	Ill.
B.S. 1911, The George Washington		Dietrich, Milton Park	MI
University		A.B. 1910, The George Washington	
Dwyer, Edward Francis	Va	University	
A.B. 1914, American College		Dixon, Jack Lee	Va
Dwyer, Edward John	MI	B.S. 1910, New York State Teachers	
A.B. 1914, The George Washington		College, Buffalo	Pa
University		Dixon, James Edward	D.C.
Dwyer, William Jr.	MI	Dixon, John May	N.Y.
B.E. 1910, Michigan Agricultural		Dixon, Richard Edward	Ill.
Experiment Station		Dixon, William Lewis	MI
Dwyer, Edgar Nelson Jr.	W.Va	Dixon, Paul Joseph	Pa
B.S. in M.E. 1911, West Virginia		Dixon, Louis Alfred	MI
University		Dixon, John David	MI
Dwyer, Mary Ann	Ill.	Dixon, Lloyd Edgar	D.C.
Dwyer, William Henry	Ill.	A.B. 1914, Pennsylvania State	
Dwyer, James Wade	Va	University	
Dwyer, George Francis	Va	Dixson, William Allen	Ohio
A.B. 1911, University of California		Dix, Mabel Elizabeth	D.C.
Dwyer, George Jr.	D.C.	Dix, Gordon Earl	Ill.
A.B. 1911, Reed College		Dix, George August	MI
Dwyer, Marlon Hyman	Ill.	Dix, John Edgar	
Dwyer, John Edgar	Calif.	B.S. 1910, Maryland State Teachers	
MI, Ohio College State College		College, Piquette	MI
Dwyer, Nathan David	D.C.	Dix, John, John Joseph	N.Y.
Dwyer, Nicholas Allen	N.Y.	Dixson, Henry Earl	
A.B. 1910, University of Buffalo		B.S. 1911, U. S. College Grant, Austin	MI
Dye, William William	Va	Dixson, John Edward	MI
A.B. 1910, University of Wyoming		Dix, George Paul	D.C.
Dyson, Jack	MI	Dixon, George August	
A.B. 1914, The George Washington		A.B. 1910, Rutledge Manual Workers	
University		College	
Dyson, Lyle Howard	MI	A.M. 1910, Wayne University	D.C.
A.B. 1914, The George Washington		Dix, Lloyd Richard	MI
University		Dixson, Roy Frank	
Dyson, Lyle Howard	D.C.	B.S. 1911, American State College for	
University		Women	N.Y.
Dyson, Robert	Va	Dixson, Francis Joseph Jr.	
B.S. 1910, Indiana University		B.S. 1911, Ohio College	MI
M.E. 1911, Ohio University		Dixson, Philip Lawrence	Va
Dye, John Arthur	Pa	Dixson, Robert Arthur	Ill.
B.S. 1910, Lehigh University		Dixson, Rufus William	
Dyke, George William	MI	A.B. 1910, A.M. 1911, The George	
Dyke, Aaron George	D.C.	Washington University	Va
Dyke, Frederick Newton	D.C.	Dyke, Victor Edward	N.Y.
Dyke, John Michael	Va	Dyke, Jack Thomas	
A.B. 1911, Princeton University		D.R. 1911, University of Buffalo	
Dyk, Mary Ann	Pa	A.B. 1911, The George Washington	
Dyk, Taylor Monroe	Ill.	University	
Dyk, Charles Charles Edward	MI	Dyson, Charles	MI
Dyk, David Bruce	Va	Dyk, George George Jr.	
A.B. 1911, University of Buffalo		B.C.E. 1910, The George Washington	
Dyk, Mary Ann	D.C.	University	
Dyk, Paul Bruce	MI	Dyk, Thomas Henry	MI
		Dyk, Robert Edward	

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Elbert, Francis Clavin	Fla.	Edwards, James Wesley	MS
A.B. 1928, University of Delaware		Edwards, Lucinda Lee	VA
M.B. 1928, University of Florida		B.S. in M.E. 1931, North Carolina	
Elbert, Joseph Warren	MI	Edgewood College	
B.S. 1928, Pennsylvania State Teachers		Edwards, Margaret	D.C.
College, Schuylkill		A.B. 1915, Rollins College	
A.M. 1931, The George Washington		Edwards, Walter	D.C.
University		Edwards, Robert Franklin	VA
Eley, James Franklin	Kan.	B.S. 1927, University of Maryland	
A.B. 1914, University of Windsor		Edwards, George	MI
Eley, Marian Moore	VA	B.S. 1929, M.S. 1931, The George	
A.B. 1914, Oberlin College		Washington University	
Edley, Mary Ann Farnum	VA	Egan, Patricia Marion	Wash
B.S. in C.E. 1922, Virginia Military		Egbert, Helen Berke	D.C.
Institute		Egbert, John Paul	MI
Edley, Miss Viola	VA	Egbert, Raymond Frederick	VA
Eckelberry, Edward Herman	Pa.	Egbert, Robert E.	MS
B.S. 1927, U.S. Naval Academy		A.B. 1915, Johns University of Iowa	
Eckert, James Edmund	N.J.	Eckstein, Arthur Elmer	D.C.
B.S. in F.E. 1926, University of Texas		Edgerton, Philip Elmer	D.C.
Eckert, Philip Frederick	Mass.	Edgerton, Philip Elmer	D.C.
B.S. 1926, U.S. Naval Academy		Edgerton, Philip Elmer	D.C.
Eckstein, Agnes Mary	Gene	Edgerton, Philip Elmer	D.C.
Eddy, Graham Joseph	VA	Edgerton, Philip Elmer	D.C.
Eddy, Martha Percival	D.C.	Edgerton, Philip Elmer	D.C.
Edelman, Leonard M.	D.C.	Edgerton, Philip Elmer	D.C.
Edgell, Charles Bernard	MI	Edgerton, Philip Elmer	D.C.
B.A. 1929, University of New Mexico		Edgerton, Philip Elmer	D.C.
M.B. 1931, Johns Hopkins University		Edgerton, Philip Elmer	D.C.
Edgerton, Richard	N.Y.	Edgerton, Philip Elmer	D.C.
A.B. 1919, Cornell University		Edgerton, Philip Elmer	D.C.
Edgar, Alan Warner	D.C.	Edgerton, Philip Elmer	D.C.
A.B. 1914, Ohio Wesleyan University		Edgerton, Philip Elmer	D.C.
Edgar, Susan Irene	Ohio	Edgerton, Philip Elmer	D.C.
A.B. 1920, College of Wooster		Edgerton, Philip Elmer	D.C.
Edgar, John	N.Y.	Edgerton, Philip Elmer	D.C.
A.B. 1920, New York University		Edgerton, Philip Elmer	D.C.
Edgar, Val	MI	Edgerton, Philip Elmer	D.C.
Edgar, William Henry, Jr.	VA	Edgerton, Philip Elmer	D.C.
Edgerton, David Paul	D.C.	Edgerton, Philip Elmer	D.C.
A.B. 1915, The George Washington		Edgerton, Philip Elmer	D.C.
University		Edgerton, Philip Elmer	D.C.
Edgar, Elizabeth Stella	VA	Edgerton, Philip Elmer	D.C.
Edgerton, George Mary	VA	Edgerton, Philip Elmer	D.C.
A.B. 1911, American University		Edgerton, Philip Elmer	D.C.
Edgerton, Miss Edith E.	MI	Edgerton, Philip Elmer	D.C.
Edgerton, Robert D.	D.C.	Edgerton, Philip Elmer	D.C.
B.S. 1924, Western University		Edgerton, Philip Elmer	D.C.
Edgerton, Gertrude Moore	D.C.	Edgerton, Philip Elmer	D.C.
B.S. 1920, Hiram University		Edgerton, Philip Elmer	D.C.
Edgerton, David Paul	Fla.	Edgerton, Philip Elmer	D.C.
B.S. 1920, University of Tennessee		Edgerton, Philip Elmer	D.C.
Edgar, Susan Irene	D.C.	Edgerton, Philip Elmer	D.C.
A.B. 1915, Georgetown University		Edgerton, Philip Elmer	D.C.
A.M. 1920, M.A. 1921, Columbia		Edgerton, Philip Elmer	D.C.
Edgell, Walter Gordon	I.	Edgerton, Philip Elmer	D.C.
A.B. 1920, The George Washington		Edgerton, Philip Elmer	D.C.
University		Edgerton, Philip Elmer	D.C.
Edgerton, David Henry, Jr.	S.C.	Edgerton, Philip Elmer	D.C.
B.S. 1920, College of Charleston		Edgerton, Philip Elmer	D.C.
Edgerton, Mary Elizabeth	R.I.	Edgerton, Philip Elmer	D.C.
B.S. 1924, U.S. Naval Academy		Edgerton, Philip Elmer	D.C.
Edgerton, James S.	Iowa	Edgerton, Philip Elmer	D.C.
B.S. 1921, U.S. Naval Academy		Edgerton, Philip Elmer	D.C.
Edgerton, George Gordon	VA	Edgerton, Philip Elmer	D.C.
B.S. 1927, Washington Polytechnic		Edgerton, Philip Elmer	D.C.
Institute		Edgerton, Philip Elmer	D.C.
Edwards, Grant Campbell	D.C.	Edgerton, Philip Elmer	D.C.
Edwards, Jonathan	D.C.	Edgerton, Philip Elmer	D.C.
Edwards, John Paul	VA	Edgerton, Philip Elmer	D.C.
B.S. 1921, Missouri State College		Edgerton, Philip Elmer	D.C.
A.M. 1926, Columbia University		Edgerton, Philip Elmer	D.C.

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Ersson, Miss Kaye	Va	Erson, Richard James	ME
Ersson, William Lars	ME	Erson, Richard James	Va
R.S. in M.E. 1911, University of Michigan		Erson, Roy Lester	ME
Erskine, Kenneth Wayne Ervin	D.C.	R.S. 1912, Indiana Central College	
Ervin, Edw.	D.C.	M.S. 1912, The George Washington University	
Erwin, Charles Robert	Va	Erwin, Walter Eugene	D.C.
R.S. 1910, University of California at Los Angeles		Erwin, William Benjamin	D.C.
M.B.A. 1915, Stanford University		R.S. 1912, University of Maryland	
Erwin, Theodore Henry	D.C.	A.M. 1912, University of Maryland	
Erwood, Harry	D.C.	Erwin, William Earl	ME
Erick, Albert Theodore	ME	Erwin, William George	Va
A.B. 1901, A.M. 1903, M.D. 1904, The George Washington University		A.B. 1914, The George Washington University	
Erick, George Fred	Va	Erwin, Franklin Milton	D.C.
Erskine, Gilbert, Jr.	Va	R.S. 1912, The George Washington University	
Erskine, Mary Rose	Ind	Erwin, Harold Earl	D.C.
A.B. 1914, University of Louisville		Erwin, K. J. Little	D.C.
Erskine, James Norman, Jr.	D.C.	Erwin, William George, Jr.	Va
Erkin, Otto Ervin	D.C.	Erwin, William William, Jr.	Va
A.B. 1915, Wisconsin College		Erwin, Louis Everett	Va
Erkin, Sarah Clara	ME	A.B. 1912, College of William and Mary	
Erskland, Lora Merrill	D.C.	Erwin, Stella Page	Ind
A.B. 1915, The George Washington University		Erwin, Francis Edwin	Ind
Erskland, John, Jr.	ME	Erwin, Joseph Adolph	Ind
Erwin, David, Jr.	D.C.	R.S. 1913, University of California	W
A.B. 1914, Vassar College		Erwin, Gustav	ME
A.M. 1915, The George Washington University		Erwin, Gustav	ME
Erwin, Elmer John	ME	A.B. 1915, A.M. 1916, The George Washington University	
A.B. 1915, College of the Pacific		Erwin, William	D.C.
M.S. 1916, University of Cincinnati		Erwin, Gustav	Va
Erwin, William James	Va	Erwin, George Henry	D.C.
Erwin, Albert Ball	W Va.	Erwin, Robert	
Erwin, Robert Calvert	D.C.		
Erwin, Elmer Monroe	Va		
R.S. 1912, 1914, Forest Institute of California			
Erwin, John David	Ohio	Erwin, Robert James	ME
Erwin, David Larry	Ind	R.S. 1912, Princeton University	D.C.
Erwin, Robert Dale	Va	Erwin, Thomas Allen	Va
R.S. 1910, Pennsylvania State University		Erwin, Thomas Allen	Va
Erwin, Mildred Anthony	N.Y.	Erwin, John W.	Va
A.B. 1916, Cornell University		Erwin, Bill May	N.Y.
Erwin, William Lee, Jr.	Va	Erwin, George John	ME
Erwin, Harry Edward	Ind	Erwin, Frank	
Erwin, David David	Ind	R.S. 1912, West Virginia Institute of Technology	
Erwin, David James	Kent	Erwin, William Albert	N.Y.
A.B. 1915, Wisconsin College		Erwin, Lawrence	D.C.
A.M. 1916, Morgan State University		R.S. 1915, S. M. J. Academy	
Erwin, Harry Abner	Ind	M.S. 1915, University of Maryland	
R.S. 1910, University of Missouri		A.M. 1916, University of Maryland	
Erwin, George Lyle	Va	Erwin, David	ME
Erwin, Frederick John	Ind	Erwin, James	D.C.
Erwin, Graham James	ME	Erwin, Samuel James	D.C.
A.B. 1915, A.M. 1916, University of Missouri		Erwin, George James	
Erwin, James Earl	Va	A.B. 1916, The George Washington University	ME
Erwin, James Earl	D.C.	Erwin, John Richard	
R.S. 1915, Spring College		R.S. 1915, University of Maryland	
Erwin, John David	Va	Erwin, John Richard	Ind
A.B. 1916, University of Vermont		Erwin, John Richard	
Erwin, Kenneth Glen	Ohio	R.S. 1915, University of Maryland	
R.S. 1915, University of Kentucky		M.S. 1916, University of Maryland	
Erwin, Kate Anthony	Va	M.S. 1916, The George Washington University	Va
Erwin, Maria Jane	ME	Erwin, John Charles	ME
R.S. 1911, Maryland State Teachers College, Towson		Erwin, John Charles	D.C.
Erwin, Patricia Joseph	D.C.	Erwin, Nicholas Louis	ME





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Glaser, Dorothy Ann	D.C.	Glaser, Robert Wade	Va
B.S. 1944, Wisconsin State Teachers		Glaser, John (1944)	Pe
College, Milwaukee		Glaser, Thomas John	Mo
Glaser, Indiana	Mo	Glaser, Thomas Arthur	D.C.
B.S. 1948, Long Island University		Glaser, Louis Lewis	Mo
Glaser, Ellen J.	Va	B.S. 1948, University of Maryland	
Glaser, Norman Foster	Okla	Glaser, Louis	Mo
A.B. 1917, Oklahoma City University		Glaser, Aaron	N.Y.
L.L.B. 1921, Oklahoma University		A.B. 1921, Wesleyan College	
L.L.M. 1925, The George Washington		M.A. 1924, De Paul University	
University		Glaser, Bernard	D.C.
Glaser, Gustave Ann	Calif. Zoro	Glaser, David David	Mo
Glaser, Gerald John	Mo	Glaser, David Michael	D.C.
A.B. in 1941, 1941, The Union		Glaser, Edgar Perry	D.C.
Washington University		A.B. 1941, University of Arizona	
Glaser, Leonard Herman	N.J.	Glaser, Freda Thoma	D.C.
B.S. 1923, Franklin and Marshall		Glaser, Helen Eugene	Mo
College		Glaser, Milton Louis	D.C.
Glaser, Louis Frank Jr.	Omaha	Glaser, Milton Louis	D.C.
A.B. 1925, Reed College		Glaser, Milton	Va
Glaser, George D.	Va	Glaser, Milton	Va
Glaser, Marion	D.C.	Glaser, Milton	Mo
Glaser, Robert Lewis	N.J.	Glaser, Milton	Mo
Glaser, Alice Andrea	Conn.	A.B. 1925, U.S. in E.E. 1928,	
Glaser, Edward Henry	Ill.	University of Maryland	
B.S. 1927, Whitman College		Glaser, John V.	Ala
Glaser, Harold Lee	Calif.	B.S. 1927, A.M. 1929, Boston University	
Glaser, Edward John	Calif.	Glaser, Harold Frederick J.	Mo
B.S. 1928, University of California		B.S. in E.A. 1931, University of	
Glaser, Joseph Joseph	D.C.	California	
Glaser, Howard W. Wood M. Jones	Mo	Glaser, Howard Allen	Va
Glaser, Michael John	Mo	Glaser, Robert Andrew Herd	Mo
A.B. 1928, Ohio State University		Glaser, Irving A.	Conn.
Glaser, John William	N.Y.	A.B. 1928, Yale University	
Glaser, John William	Swiss	Glaser, Joseph M. P.	D.C.
Glaser, Dorothy May	Mo	Glaser, Joseph M. P.	
Glaser, Tom Wallace	Ind.	B.S. 1928, Ohio State University	
A.B. 1928, 1928 University of Iowa		Glaser, Joseph M. P.	Mo
Glaser, James Hartman	D.C.	B.S. 1928, Ohio State University	
B.S. 1928, Duke University		Glaser, Joseph M. P.	D.C.
Glaser, John Ann	D.C.	Glaser, Joseph M. P.	D.C.
Glaser, Ralph Ray	N.C.	Glaser, Joseph M. P.	Mo
A.B. 1927, University of North		Glaser, Joseph M. P.	D.C.
Carolina		Glaser, Joseph M. P.	Va
Glaser, Leo	D.C.	Glaser, Joseph M. P.	
Glaser, Bernard Urban	Mo	B.M. 1928, College of the Holy of	
Glaser, Peter	D.C.	New York	
Glaser, William Platt	Ind.	Glaser, Joseph M. P.	D.C.
Glaser, William E.	Calif.	Glaser, Joseph M. P.	D.C.
A.B. 1928, Colorado College		Glaser, Joseph M. P.	D.C.
Glaser, Linda Anderson	Ind.	Glaser, Joseph M. P.	Va
Glaser, Peter Elmer	Va	Glaser, Joseph M. P.	Va
Glaser, James Elmer	Va	Glaser, Joseph M. P.	Va
Glaser, Frances Rose	D.C.	B.S. 1928, University of Maryland	
A.B. 1928, Boston College		Glaser, Joseph M. P.	Mo
Glaser, Mark Lawrence	D.C.	Glaser, Joseph M. P.	
A.B. 1928, St. Mary's University		B.S. 1928, C.E. 1931, C.E. 1931, University	
Glaser, Arnold Fern	D.C.	of Pennsylvania	
Gibbs, Harry	N.Y.	Glaser, Joseph M. P.	Va
A.B. 1928, Harper College		Glaser, Joseph M. P.	Conn.
Glaser, William M.	D.C.	Glaser, Joseph M. P.	N.Y.
Glaser, Theodore	Conn.	Glaser, Joseph M. P.	
A.B. 1928, Bowdoin University		A.B. 1928, Bowdoin University	
L.L.B. 1928, Harvard University		A.M. 1928, Yale University	
Glaser, William Thomas	N.C.	Glaser, Joseph M. P.	Va
Glaser, John Mae	Mo	B.S. 1928, Yale University	
Glaser, Milton Thomas	Mo	Glaser, Joseph M. P.	Mo
B.S. 1927, University of Maryland		Glaser, Joseph M. P.	Mo
E.A.M. 1928, Johns Hopkins		Glaser, Joseph M. P.	Mo
University		B.S. 1928, University of Maryland	
Glaser, George Edward	Va	Glaser, Joseph M. P.	Mich
A.B. 1928, Long Island University		B.S. 1928, University of Maryland	
Glaser, Charles Clifford	Va	Glaser, Joseph M. P.	Va
A.B. 1928, West Virginia University		Glaser, Joseph M. P.	

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Graham, Geraldine Anne	D.C.	Graham, Joseph Anthony	Conn.	
Graham, Nancy Jane	Va.	Graham, Pauline Harwood	Va.	
Graham, Peter L.	Qldw.	Graham, Samuel Lee	Md.	
Graham, Linda Elaine	Va.	Graham, Thomas Anthony	Ill.	
B.S. 1947, A.M. 1948, University of Virginia		B.S. 1943, Ph.D. 1947, Saint George's	Md.	
Graham, Michael Joseph H.	Va.	Graham, Edward Harrison	B.S. in P.E. 1947, A.M. in Ed. 1949, The George Washington University	Va.
Graham, William Dwight	Va.	Graham, Gerald	Va.	
Graham, Jean Mary Alfred	D.C.	Graham, Howard Robert	Va.	
A.B. 1935, Washington and Lee University		B.M.E. 1945, Citizens of the City of New York	N.J.	
Graham, Patricia Anne	D.C.	Graham, James Joseph	B.S. 1948, U. S. Military Academy	
Graham, Lynda	Va.	B.S. 1946, U. S. Military Academy		
Graham, Stephen	Md.	B.S. 1946, U. S. Military Academy		
Graham, Vincent James	D.C.	Graham, John David	Conn.	
B.S. 1946, Miami Teachers College		Graham, Lawrence Thomas	Va.	
Graham, Natalie	Calif.	B.S. 1947, U. S. Naval Academy	Va.	
Graham, Ruth Anne	Md.	Graham, Michael James	Va.	
A.B. 1946, The George Washington University		Graham, Gerald Thomas	Va.	
Graham, William Arthur	N.Y.	Graham, Paul Thomas	N.Y.	
B.S. 1946, University of Pennsylvania		B.S. 1947, University of Illinois	N.Y.	
A.M. 1948, Columbia University		Graham, Robert Arthur	Md.	
Graham, James Auld	Ill.	A.B. 1946, Columbia University	Md.	
Graham, Alexander L.	Va.	Graham, Robert Joseph	Va.	
Graham, Elizabeth Mae	Calif.	Graham, Thomas Edward	Va.	
A.B. 1946, The George Washington University		Graham, William Clark	N.Y.	
Graham, Stephen John	D.C.	Graham, Charles Gary	B.S. 1947, University of Miami	Ill.
Graham, William Edward	Md.	B.S. 1947, University of Miami		
B.S. in M.E. and A.E. 1944, New York University		Graham, David Lewis	Ill.	
Graham, David John	Va.	Graham, Marvin Stanley	Va.	
Graham, Roger Elton	Va.	Graham, Arthur Leonard	Ill.	
Graham, Thomas Moore	Ky.	Graham, Henry Elton	Va.	
Graham, Wilton A. Lee	Md.	Graham, Francis Elton	Va.	
A.B. 1946, A.M. 1947, Syracuse University		Graham, Frank Weston, Jr.	Ill.	
Grey, Charles Wilson	Conn.	Graham, Harry	B.S. 1947, Harvard University	Va.
B.S. 1944, M.D. 1947, Stanford University		Graham, Katherine Virginia	A.B. 1946, Georgia Southern College	
Grey, Thomas Charles	Md.	A.M. 1946, Ph.D. 1949, The George Washington University	Va.	
Grey, David Wayne	Tenn.	Graham, Marion Darby	B.S. 1946, Georgia Institute of Technology	Md.
A.B. 1947, University of Texas		Graham, Robert Martin	Ill.	
Gwyn, David Andrew	Va.	Graham, Robert Ross	Ill.	
Gwyn, James Vernon	Pa.	Graham, Robert Ross	Ill.	
Gwyn, John Vincent	Va.	Graham, Robert Ross	Ill.	
Gwyn, John Marie	D.C.	Graham, Robert Ross	Ill.	
Gwyn, Mary Lynn	Md.	Graham, Robert Ross	Ill.	
Gwyn, Patricia Lillian	Va.	Graham, Robert Ross	Ill.	
A.B. 1947, The George Washington University		Graham, Robert Ross	Ill.	
Gwyn, Fred John	Va.	Graham, Robert Ross	Ill.	
Gwyn, David Richard	Calif.	Graham, Robert Ross	Ill.	
A.B. 1947, University of Utah		Graham, Robert Ross	Ill.	
Gwyn, Ben Thomas	W. Va.	Graham, Robert Ross	Ill.	
A.B. 1947, Indiana College		Graham, Robert Ross	Ill.	
A.M. 1947, West Virginia University		Graham, Robert Ross	Ill.	
Gwyn, Robert Allen, Jr.	Va.	Graham, Robert Ross	Ill.	
B.S. 1946, The George Washington University		Graham, Robert Ross	Ill.	
Gwyn, John A. V.	Ill.	Graham, Robert Ross	Ill.	
A.B. 1947, University of Illinois		Graham, Robert Ross	Ill.	
Gwyn, James Junior	D.C.	Graham, Robert Ross	Ill.	
Gwyn, Lawrence	D.C.	Graham, Robert Ross	Ill.	
Gwyn, David Bruce	Md.	Graham, Robert Ross	Ill.	
Gwyn, Alfred Paul	Md.	Graham, Robert Ross	Ill.	
A.B. 1946, Stanford College		Graham, Robert Ross	Ill.	
Gwyn, Thomas Francis	Va.	Graham, Robert Ross	Ill.	
A.B. 1946, Stanford College		Graham, Robert Ross	Ill.	
Ill. 1946, The George Washington University		Graham, Robert Ross	Ill.	





Gilbert, Norman W.	Va	Hahn, Axel	D.C.
B.S. 1941, Boston College		Lecturer 1944, Hahn Teachers	
Gilbert, Mary Thomas	D.C.	Teacher School 1944	
Giles, Hamilton Raymond	Md	A.M. in B.S. 1938, The George	
A.B. 1939, University of Chicago		Washington University	
Gilling, M. C.	Ohio	Hackman, Clifford Mark	Md
Ginsburg, Robert Harry	Under	B.S. 1941, University of Michigan	
B.S. 1941, University of California		Hahn, Richard Bruce	Md
Ginsburg, Lawrence Kravitz, Jr.	Calif.	B.S. in Ed. 1941, Pennsylvania State	
A.B. 1936, M.S. 1939, University		Teachers College, Middletown	
of California, Los Angeles		Hackett, John Paul	D.C.
Gins, Charles Bruce	D.C.	Hackett, Norman J.	D.
B.S. in A.E. 1940, University of		Hackett, John Paul	D.
Michigan		Hackett, Robert A. H.	W.Va.
Gins, Norman David	Va	A.S. 1931, Deane University	
A.B. 1940, The George Washington		Hackett, John Robert	N.Y.
University		A.S. 1937, Cornell University	
Ginsburg, Ronald Edgar	N.J.	M.S. 1934, University of North	
Gins, David Charles	Inda	Carolina	
Gins, Jacob	Md	Hadley, Robert Paul	Miss
B.S. in E. 1941, College of the		Hadley, George Vernon	Md
City of New York		Hadley, Harold Henry	
Gins, Harold George	Va	A.B. 1936, Williams College	D.C.
B.S. 1940, U.S. Naval Academy		Hahn, R. Carl Allen	La
Gins, Louis Morris	Va	Hahn, William Henry, Jr.	
Ginsburg, Harry S., Jr.	Va	B.S. 1938, Tulane University of	
Gins, Janet Bailey	Va	Louisiana	
A.B. 1940, Virginia Union University		Hahn, Joseph John	N.Y.
Ginsburg, Charles Martin	D.C.	Hahn, Joseph Robert	N.Y.
Ginsburg, Charles Martin	N.J.	Hahn, Peter Louis	Va
Gins, Louis Joseph	D.C.	A.S. 1936, St. Francis College	
Gins, Joseph George	Pa	Hahn, Robert William	Va
A.B. 1937, St. Vincent College		Hahn, Harold Melvin	Miss
Ginsburg, Herman E.	Pa	A.B. 1938, St. John's College	Miss
A.B. 1941, University of Kentucky		Hahn, Fred Henry	
Ginsburg, Ruth Anne	Germany	A.E. 1935, St. John's College	Va
Ginsburg, Louis Robert	D.C.	Hahn, Alfred Thomas	
A.B. 1934, The George Washington		A.P. 1938, College of William and	
University		Mary	Pa
Ginsburg, Emily Marie	Va	Hammock, Kathleen Lisa	N.J.
Ginsburg, John Coleman	D.C.	Hammock, John Thomas	
Ginsburg, Louis Thomas	Pa	B.S. 1939, Philadelphia University	
A.B. 1937, M.S. 1941, Pennsylvania		University and Science	
State University		Hahn, Louis Mark	Md
Ginsburg, Joseph Edward	D.C.	Hahn, George Frederick	W.Va.
A.B. 1939, Georgetown University		Hahn, Joseph William, Jr.	
Ginsburg, Robert Wyndell	Va	B.S. in B.S. 1939, West Virginia	
Ginsburg, Richard M.	Ill.	University	
Ginsburg, Judah Benjamin	Ill.	Hansen, Mark Harmon	Va
Gins, David Martin	N.J.	B.S. 1939, Nebraska Wesleyan	
Gins, William Henry	Md	University	
A.B. 1947, Northwestern University		Hahn, Thomas	D.C.
A.M. 1948, Boston University		Hart, Ronald, Jr.	
Ginsburg, Ray	Pa	A.P. 1939, The George Washington	
Gins, Harry Lawrence	Miss	University	
A.B. 1938, Marquette State University		Hartman, James Edward	
Ginsburg, Lawrence C.	Md	B.S. 1939, University of Kentucky	W.Va.
B.S. in M.E. 1940, Pittsburg		Hart, Ray Russell	N.Y.
University and Mechanical College		Hart, Robert	
Ginsburg, James H.	Va	B.S. in B.S. 1938, University of	
Ginsburg, John Williams, Jr.	Iowa	Maryland	
A.B. 1934, Iowa University at Iowa		Hahn, Carl E.	N.J.
Ginsburg, John Lewis	Va	A.B. 1944, Marquette College	Md
		Hahn, George Christian	Va
		Hahn, Benjamin Elmer	D.C.
		Hahn, William Robert, Jr.	
		Hahn, Walter Joseph	
		B.S. 1944, Georgetown University	D.C.
		Hahn, William George	
		Hahn, William C.	
		Hahn, Joseph C.	
		A.B. 1941, Shaw University	









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Hartwell, Margery Elaine	D.C.	Hawkins, Eva Fencil	M.
Hartwell, Paul Lee	Va	Hawkins, Ernest Carson	W Va
Hartwig, Emma Jane	D.C.	H.A. 1901, West Virginia University	
Hartwig, Leonard John	D.C.	Hartman, James Neil	N.J.
Hartz, Louis Charles	Va	Hartman, Karlstrom	(A)
Harvey, Alva Fernald	D.C.	Hartman, Mary Elton	Ind.
Harvey, Barbara Elliott	Mo	A.R. 1927, University of Wisconsin	
A.R. 1926, The George Washington University		Hart, Mary Louise	D.C.
Hartwig, Doris H. Hixon	MI	Hartke, Kenneth Kay	Ind.
B.S. 1929, University of Minnesota		Hartshill, Yvonne	
Hartwig, Joseph Benjamin	D.C.	A.R. 1926, University of Hawaii	
B.S. 1934, The George Washington University		Hartshorn, Eric Bruce, Jr.	MI
Hartwig, Irene Mae	D.C.	Hartshorn, Patricia Ann	Conn.
Hartwig, Linda Virginia	MI	Hart, Donald Joseph	
Hartwig, Richard	I.C.	B.S. 1931, Cornell University	
Hartwood, Harold Stanley, Jr.	Va	Hart, Kathleen Kendall	Va
Haskell, Francis Wayne	N.Y.	B.S. 1932, University of Maryland	
B.S. 1948, U.S. Military Academy		Hart, Louise Beverly	Va
LL.B. 1952, University of Missouri		A.R. 1935, Marquette College	
Hale, Carl William	Va	Hart, Michael James	MI
Hallam, Margaret Virginia	W Va	Hart, Raymond John, Jr.	Va
B.S. 1934, West Virginia University		P.H.D. 1951, New York State	
Hallings, Margaret Jean	Va	Teachers College, Columbia	
Halliday, Catherine Parry	Ind.	Hart, Thomas Frederick, Jr.	Va
A.R. 1941, University of Hawaii		Hart, Vernon James	
Haley, John Manning	Va	B.S. 1935, U.S. Army Academy	
Haley, Lawrence Wayne	Va	M.S. 1941, Massachusetts Institute of Technology	
Haley, Ross C.	MI	Hart, Walter Francis, Jr.	
Hall, Gladys B. Roseberry	Va	A.R. 1945, University of Vermont	
B.S. 1934, Southern P. Austin College		Hartwell, Evelyn Alice	Ind.
Halladay, Richard David	Va	Hartwell, Stanley Ross	Ind.
Hallam, George Arthur	Va	Hartwell, Sam Henry	Va
B.S. 1916, U.S. Naval Academy		Hartwell, Robert Charles	
M.S. 1920, Columbia University of California		A.R. 1911, Transylvania College	
Hallam, Mary Ann	D.C.	A.R. 1924, Georgia Institute of Technology	
Hallam, William George	D.C.	Hartwell, William Arthur	Va
A.R. 1936, New Jersey State Teachers College, Morristown		B.S. 1938, U.S. Army Academy	
A.M. 1947, 1947, The George Washington University		Hartwell, William Francis	D.C.
Hallam, John P.	MI	Hart, Charles	Va
Hallam, Thomas Alexander III	Va	A.R. 1935, U.S. Army Academy	
Hall, William Cecil	N.D.	Hart, John Marshall	Ind.
B.S. 1930, University of North Dakota		A.R. 1935, University of Maryland	
Hallgren, Howard Edward	Va	Hart, Richard Paul	
A.R. 1931, University of Minnesota		B.S. 1931, University of Maryland	
Hallgren, Faye Jean	Va	Hart, Richard George	Ind.
A.R. 1934, College of William and Mary		B.S. 1935, University of Maryland	
Hallgren, Earl D. Jane Campbell	Va	Hart, Sam	Ind.
Hall, Richard	MI	Hartwell, John Francis, Jr.	MI
Hall, Mary Elizabeth	Va	B.S. 1935, University of Maryland	
B.S. 1935, University of Wisconsin and Marquette		Hart, Earl Marshall	D.C.
Hall, Mary	Ind.	O.D. 1937, University of Louisville	
Hall, John Franklin	MI	Hart, Nancy Lee	Ind.
Hallman, William Francis	MI	Hartman, Donald Eric	Va
B.S. 1934, The George Washington University		Hartman, Daniel William	Ind.
Hallman, Nathanial William, Jr.	MI	Hart, Edgar Henry	MI
Hallman, Herman Albert	MI	A.R. 1935, Texas Tech University	
B.S. 1935, Georgetown College		Hartley, Francis Francis	MI
A.M. 1935, Columbia University		Hartley, Edwin Marie	MI
Hallman, David Harold	Va	Hart, John Mayhew	
Hallman, David Bruce	Va	B.S. 1935, University of North Carolina	N.Y.
Hallman, John William	MI	Hartley, John Henry	Ind.
Hallman, Edward Hamilton	MI	Hart, John Thomas	
Hart, Elizabeth	N.C.	A.R. 1935, Ohio University	
A.R. 1935, University of North Carolina		Hart, Donald Paul	Ind.
Hartman, David Robert	Wash.	Hart, Ross Edward	
A.R. 1935, Harvard University			
Hartman, Edward John	Va		

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Hix, William Leigh	ME	Hix, Edwin Marvin	Vt
A.B. 1940, Western Kentucky State		A.B. 1936, Tennessee University	
Teacher College		Hix, John Edgar	ME
Hix, William Kenneth	D.C.	A.B. 1934, University of Missouri	
Hix, John Lee	D.C.	Hix, Thomas Stanford	Conn
Hix, J. A. Bill, Editor	MI	Hix, Virginia Lee	Ar
Hix, John Henry	MA	Hix, William Francis	Ar
A.B. 1936, Georgetown College		Hix, William Joseph	MA
B.S. 1940, Johns Hopkins University		Hix, William	N
Hix, Nancy Ann	TA	Hix, William Louis	I
Hix, John Van Tu	Vt	Hix, Charles Edgar	I
A.B. 1941, Marquette College		Hix, Peter Lynn	I
Hix, Marion Louise	MI	Hix, Raymond Allen	I
Hix, Thomas George	Ar	B.S. 1941, University of Florida	
B.S. 1941, Virginia Polytechnic		Hix, William Marvin	Vt
College		A.B. 1941 and A.M. 1943, The George	
Hix, Lloyd Robert	MA	Washington University	
Hix, Charles Allen	I.C.	Ph.D. 1945, Catholic University of	
A.B. 1939, Yale University		America	
Hix, Eugene Victor	MI	Hix, Samuel	I
B.S. 1941, The George Washington		Hix, Ralph Davis	V
University		Hix, Harold Eugene	Ar
Hix, Jerry John, Jr.	Vt	Hix, Charles William	Ar
Hix, James George	Ar	A.B. 1935, Brown University	
A.B. 1934, University of Georgia		Hix, Donald H. Hall	Vt
Hix, Mary Edward, Jr.	V	Hix, Eugene Isaac	Ar
Hixson, Robert Wayne II	Vt	A.B. 1931, University of California	
Hixson, Mark Nelson	I.C.	at Los Angeles	
Hixson, Richard Elin	Ar	A.M. 1933, The George Washington	
B.S. 1931, University of Arizona		Hix, Eugene	I
Hixson, John E. Dwyer	Cal	Hix, Richard	MI
Hixson, David M. McLean	Vt	Hix, Ralph Allen	Ar
B.S. 1935, Connecticut University		Hix, George William	W
Hixson, Gary Earl	Conn	Hix, Thomas William	
Hixson, Betty Lee	Vt	Hix, George William	
A.B. 1935, South Saint College		Hix, Thomas William	
Hixson, John Allen	Vt	A.B. 1935, University of Washington	
Hixson, Joseph Douglas, Jr.	Vt	A.M. 1936, Catholic University	
A.B. 1931, University of North		Hixson, George	I
Carolina		Hixson, John	MI
Hixson, Franklin	Vt	A.B. 1935, U.S. Army Medical	
Hixson, Robert Bentley, Jr.	D.C.	College	
Hixson, Murray George	MI	Hixson, Robert Nelson	W
B.S. 1936, University of Maryland		B.S. 1936, M.D. 1938, University of	
Hixson, William Allen	D.C.	Wisconsin	
Hixson, Thomas Allen	D.C.	Hixson, George	W
B.S. 1934, University of Chicago		B.S. 1936, Pennsylvania State	
Hixson, Charles Edward	N.C.	University College, Baltimore	N.M.
B.S. 1935, North Carolina College		Hixson, Robert Lee	Vt
at Durham		Hixson, William Bruce	D.C.
Hixson, Arnold James	MI	Hixson, David William	MI
Hixson, William Allen	I	Hixson, David	
A.B. 1936, University of Pennsylvania		B.S. 1936, University of	
Hixson, Charles Michael	Vt	America	
Hixson, Charles	D.C.	Hixson, Richard Henry	I
Hixson, David Bruce	MI	Hixson, William Henry	Ar
Hixson, David Milton	D.C.	A.B. 1934, Marshall College	
Hixson, David Bruce	Ar	Hix, Philip George	I
B.A. 1941, Johns Hopkins		Hixson, Mary Elizabeth	MI
University of Baltimore		Hixson, George Elmer	Ar
Hixson, Edward Leroy	D.C.	Hixson, Richard Gerald	Ar
B.S. 1939, Kentucky College		Hixson, Roy Lewis	Vt
A.M. 1941, The George Washington		B.S. 1935, University of Iowa	
University		Hixson, William Carl, Jr.	Vt
Hixson, John Kenneth	Ind	B.S. 1936, American University	
Hixson, Martin Francis	Ind	Hixson, William John	MI
Hixson, Mary Elizabeth	D.C.	B.S. 1935, The George Washington	
Hixson, Paul James	D.C.	University	I
Hixson, William George	D.C.	Hixson, David John	N.J.
Hixson, Barbara Ann	D.C.	A.B. 1935, Ohio State	
Hixson, Douglas Edgar	MI	A.M. 1936, The George Washington	
B.S. 1939, The George Washington		University	
University		Hixson, William George, Jr.	
M.S. 1941, Massachusetts Institute of		A.B. 1934, New York University	
Technology			





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Kearns, Barbara Ann	N.I.	Kelley, Richard Allen	N.Y.
A.B. 1973, Colby College		B.S. 1946, U.S. Military Academy	
Kear, Donald Bruce	D.C.	Kelly, Richard James	Md.
Kearney, John Lawrence	Mass.	A.B. 1915, Western Maryland College	
A.B. 1915, Boston College		Kelly, Charles Vincent	Va.
Kearney, Robert Edward	Wash.	A.B. 1915, Boston College	
A.B. 1915, University of Washington		Kelly, Catherine Anne	Cal.
Kearney, Bill Lee	Va.	Undergraduate Thesis	
Kelake, Kenneth, Jr.	Md.	Kelly, James Duffell	Md.
B.S. 1972, University of Maryland		B.S. 1944, M.A. 1947, University	
Kelch, Edwin William	Pa.	Michigan	
A.B. 1948, Temple University		Kelly, John Edward	D.C.
A.M. 1948, 1949, Tulane College		Kelly, James Joseph	Va.
Washington University		Kelly, James Joseph	Md.
Kelch, William Houston	Pa.	Kelly, John Joseph	N.Y.
Kel, Owen Eugene	Va.	Kelly, John Joseph, Jr.	Md.
Kelley, Delbert Edmund	ME.	A.B. 1911, Cornell College	
Kelley, Joseph Edward	Ill.	Kelly, John Joseph	Va.
Kelley, Pauline Jean	D.C.	Kelly, Joseph James	Md.
Kelley, Warren McKim	Mass.	Kelly, Joseph James	Md.
A.B. 1914, Amherst College		Kelly, Margaret Margaret	Cal.
Kelley, Walter James	Ill.	Kelly, Raymond Edward	Va.
Kelley, Charles Franklin	Ill.	Kelly, Robert Charles	Cal.
B.S. 1913, Mount Union College		Kelly, Robert Charles	Cal.
Kelley, Michael Augustine	Va.	B.S. 1910, Mount State College	
Kelley, John Paul	Va.	Kelly, Ben Harrison, Jr.	Md.
Kelley, Harry Lee	D.C.	Kelly, Thomas J.	Ill.
A.B. 1918, Rutgers College		Kelley, William Allen	Ill.
A.M. 1918, Wayne Reserve University		Ph.D. 1921, B.S. 1913, University	
Kelley, James George	D.C.	of Maryland	
Kelley, William Francis	Va.	Kelley, Ann Northrup	Ill.
Kelly, William Elmer	Pa.	A.B. 1915, Cedar Creek College	
Kelley, Ann Jackson	ME.	Kelley, Thomas	Ill.
Kelley, Emma Frances	D.C.	B.S. 1915, Middlebury College	
B.S. 1911, University of Maryland		Kelley, David	Va.
Kelley, James William, Jr.	R.I.	A.B. 1914, University of Rochester	
B.S. 1916, Bowdoin College		Kelley, William Robert	Mass.
Kelley, John Francis	Pa.	B.S. 1915, State Normal School of	
Kelley, Edward James	D.C.	Ill.	
Kellogg, Robert Woodward	ME.	Kelley, Wilbur E.	Mass.
A.B. 1915, Michigan College		Kelley, James Thomas	Cal.
Kelley, Joseph Edward	D.C.	A.B. 1915, University of Ark.	
Kelly, Theodore Roy	Pa.	Kelly, James Thomas	Md.
A.B. 1915, Columbia University		Kelly, Karl Richard	Va.
Kelly, George Clinton, Jr.	D.C.	Kelly, Robert Martin	
B.S. 1915, Duke University		B.S. 1915, University of Maryland	
Kelly, John	Va.	Kennedy, James Joseph	Mass.
Kelly, Robert James	Va.	Kennedy, Harold William	Mass.
Kelly, Thomas Russell	Cal.	Kennedy, Arthur James	Md.
Kelly, William Charles	Pa.	Kennedy, Clifford Maynard	
A.B. 1915, The George Washington		B.S. 1914, University of Maryland	
University		Kennedy, Mary Josephine	S.C.
Kelly, George	Ill.	Kennedy, Richard Eugene	
B.S. 1915, Georgetown University		A.B. 1915, Georgetown College	
Kelly, Robert Joseph	ME.	Kennedy, James Allen	Pa.
B.S. 1915, Mount College		Kennedy, Thomas James	Ill.
Kelly, John Edward	Mass.	Kelly, Norman Louis	
B.S. 1915, University of Maryland		B.S. 1915, Virginia University	
Kelly, Fred Thomas	Va.	Kennedy, Marvin Edmund, Jr.	
A.B. 1915, Syracuse University		B.S. 1915, State University of	
Kelly, Philip Cary	Pa.	Ark.	
B.S. 1915, San Jose University		Kennedy, Alice Marie	
Kelly, Robert Francis	Va.	A.B. 1915, University of Tennessee	
B.S. 1915, F.D. 1915, F.D.M. 1915, Boston		Kennedy, North Allen	
University		B.S. 1915, Massachusetts State	
Kelly, Benjamin George	W.Va.	Teachers College, Lowell	
A.B. 1915, Ohio University		Kennedy, William James	
Kelly, Wayne Franklin	Pa.	Kennedy, Frank Edward	Mass.
A.B. 1915, Virginia University		Kennedy, Joseph William	Mass.
Kelly, Joseph James	Ohio	B.S. 1915, Mount College	
A.B. 1915, Miami University		Kennedy, Mary Elizabeth	Ill.
Kelly, John James	ME.	Kennedy, Patrick Ernest	Va.
B.S. 1915, University of		Kennedy, Philip Dale	
Mass.			







Riley, Morris	Va	Rosen, Irene Cassin	I-C
B.S. 1911, The George Washington University		B.S. 1920, Wayne Teachers College	Va
Rosenbush, James Joseph	S.D.	Rosen, Elizabeth Emily	Va
Albany, John Francis	Md	Rosen, Robert Clinton	I-C
Rosen, John Maxwell	Va	Rosen, David Stephen	Va
Rosenstein, Edward Theodore	I-C	Rosenstein, Isaac Reuben	Unl
Roth, Philip Joseph	Va	Rosenstein, Simon E.	Md
Roth, Edward Samuel	Va	Rosen, Anna Florence	Va
A.B. 1918, University of Pennsylvania		Roth, Donald Wayne	I-C
M.S. 1920, The George Washington University		Roth, Albert L. Jr.	Va
Roth, Joe	Md	Rosenstein, Miriam	Md
B.S. 1918, American University		Roth, Anna Rebecca	
M.S. 1920, The George Washington University		A.B. 1922, University of Florida	
Roth, Jack Paul	Md	A.M. 1927, The George Washington University	
M.S. 1920, University of Louisville		Roth, Emma Grace	Va
Roth, Peter Lee	I-C	Roth, Susan Vincent	Va
Roth, Raymond Adam	I-C	Roth, Ullrich David	Md
A.B. 1920, Lebanon Valley College		B.S. 1922, Grant Institute of Naval Architecture	
Roth, Robert George	Md	Roth, Susan	Md
A.B. 1922, Harvard University		Roth, Isaac	Va
Rothstein, James Robert	Md	Rothstein, Ian	I-C
A.P. 1922, A.M. 1923, Johns Hopkins University		Rothstein, Gustave Elizabeth	I-C
Roth, Julia B.	Md	Rosen, Robert Joseph	Md
Roth, John Robert	Va	Rosen, Dorothy Ellen	I-C
E.M. 1918, New York State Maritime College		A.B. 1920, The George Washington University	
Ruppel, Rudolph	N.Y.	Rosen, Karl Louis	I-C
B.S. 1918, U.S. Naval Academy		Rosen, Helen Thorne	I-C
Ruppel, Mary Helene	I-C	Rosen, John Henry	Va
Russ, Joseph George	N.J.	B.S. 1920, New York University	Md
Russ, Maria Emma	I-C	Rosen, Louis Reub	Germany
A.B. 1913, Sweet Briar College		Rosen, William Paul	
Russ, David Allen	I-C	B.S. in P.E. 1914, Georgetown University	
A.B. 1914, University of Southern California		Rosen, Rosalia Marie	I-C
Russell, Charles A. Herman	Md	Rosen, Thomas Joseph	N.Y.
Russ, Arthur	Md	Rothley, David Neil	I-C
B.S. 1911, University of Maryland		B.S. in P.E. 1920, Lafayette College	I-C
Russell, Joseph Paul	Md	Roski, Robert Nicholas	I-C
Russell, Elizabeth Ruth	N.Y.	Roth, Donald Philip	I-C
Russell, Edward Morris, Jr.	Md	A.B. 1911, Ohio State University	
Russell, Eugene Morris	I-C	Roth, Francis J.	I-C
Russell, William Paul	Yugoslavia	B.S. 1920, The George Washington University	
Russell, Charles Raymond	Va	Roth, Robert Louis	I-C
B.S. 1920, University of Utah		Rosenstein, Augusta Louise	I-C
Russell, George Lloyd Jr.	Va	A.B. 1915, Tulane College	I-C
B.S. in P.E. 1920, Furber University		Rothstein, Samuel Zachariah	I-C
Russell, Leland Donald	I-C	B.S. A. 1921, Wayne College, Ohio	I-C
Russell, Mary Wilson	Va	Rosen, Gerald Albert	Va
A.B. 1924, Cleveland College		Roth, William Milagore	I-C
A.B. in P.E. 1915, The George Washington University		Rosen, Ray John	Md
Russell, William	Va	Rothstein, Gustav Berne	Md
Russell, John Thomas	Va	Rothstein, John Berne	W.Va.
Russell, Helen Elizabeth	I-C	B.S. 1921, University of Maryland	
Russell, John Robert	Md	Rosen, Mark Alexander	
Russell, Leroy Joseph	Va	B.S. 1920, Marshall College	
B.S. in P.E. 1911, Iowa State College		A.M. 1915, The George Washington University	
Russell, Frank Thomas	Md	Rosenstein, Ian Charles	Kana.
Russell, Mary Frances	A.A.	B.S. 1920, M.E. 1921, Municipal University of Wichita	N.Y.
Russell, Samuel John	Md	Roski, George	Hawaii
Russell, Edward Andrew	I-C	A.B. 1922, New York University	
B.S. 1920, Northwestern University		Rosinski, Walter Kenneth	
Russell, Keith Paul	Md	B.S. 1924, University of Hawaii	Wa.
Russell, Anna Ida	I-C	Rosinski, Anna Alfred	
		B.S. 1922, University of Wisconsin	N.Y.
		Rosinski, Gerald	

Kent, Foster	D.C.	Kraft, Stanley Eugene	D.C.
M.A. 1941, University of Zurich		Kraus, Thomas G.	C.D.
Switzerland		Krajak, John Joseph	M.D.
Licentiate Honor 1945, University of		Kramer, John A.	R.I.
Geneva, Switzerland		Kramer, Marshall Louis	D.C.
Certificat de Licentiat 1949, University		Kramer, Glen Milton	I.C.
of Geneva		Kramer, Robert	V.
Kent, Cyril Anthony	M.D.	Kramer, Ronald Joseph	I.C.
Kent, Nancy Jane	D.C.	Kraus, Howard Bruce	I.C.
Kepner, Lawrence Mac	O.D.	Kraus, William Stephen	V.
Kepner, John Thomas	M.D.	B.S. 1943, A.M. 1944, Columbia	
Kerr, A. and Earl Stevenson	V.	University	
Kepner, Elizabeth Jonathan	M.D.	Ph.D. 1944, University of Vienna	
A.B. 1944, University of Chattanooga		Kraus, Otto	I.C.
Kessel, Louis Louis	I.	Ph.D. 1949, Louisiana State University	
Kesseler, Charles Konstantinos	I.C.	Krey, Jean Louis	M.D.
Kessler, Stanislaus Charles	I.C.	A.B. 1941, A.M. 1944, University of	
Kessner, Stanley Vincent	I.	Arkansas	
Kessel, Richard V.	M.D.	Kreiss, Fritz Joseph	I.C.
Ketch, Charles William	V.	Kreiss, Frederick Ernst	M.D.
B.S. 1941, M.A. 1942, University of South		Kreiss, Richard Carl	V.
Carolina		Kreiss, William Victor	N.Y.
Kett, Eugene James	D.C.	Kreiss, Fritz Gustav	N.Y.
Ketzel, George Edward	V.	Kreiss, John Edgar	M.D.
A.B. 1941, Indiana University		Kreiss, Joseph William	I.
Ketzel, Judy Ann	I.C.	B.S. 1944, Georgetown University	
Kewadine, Art	N.I.	Kreiss, Walter	V.
Kewenau, Robert Ann	I.C.	Kreiss, Robert Thomas	V.
Kewenau, William Robert	V.	Kreiss, Eugene Charles	I.C.
B.S. 1944, New England University		Kreiss, Carl John	V.
Kewenau, David Ann	V.	Kreiss, Eugene Martin, Jr.	V.
Kewenau, David Vincent	V.	Kreiss, Robert Thomas	V.
Kewenau, Mary Frances	M.D.	B.S. 1941, M.A. 1942, University of	
Kewenau, Alexander	C.D.	Maryland	
B.S. 1942, University of California at		Kreiss, John H.	M.D.
Los Angeles		B.S. 1944, College of the Holy	
Kick, Arden Eugene	M.D.	New York	
B.S. 1941, Northern Michigan College		Krich, Walter Eugene	I.C.
of Education		Krich, William H. Jr.	I.C.
Kick, David Ray	M.D.	Krich, George Louis Jr.	M.D.
Kick, John Robert	M.D.	Krich, Henry J.	M.D.
Kirk, Raymond George	V.	B.M.E. 1944, The Johns Hopkins	
Kirk, Leslie Park	M.D.	University	
Kirk, Gene William	M.D.	Krich, George Arthur	I.C.
Kirk, Frank	I.	Krich, Thomas Franklin	I.C.
Kirk, David	I.	Krich, Thomas Franklin	I.C.
Kirkland, William Edgar	V.	Krich, John William	I.C.
A.B. 1940, A.M. 1941, University of		Krich, George of Ann	I.C.
Michigan		Krich, George	I.C.
Kirsh, Harry F.	M.D.	Krich, George	I.C.
A.B. 1941, St. Francis College		Krich, R. M. Martin	I.C.
Kirsh, William Paul	V.	Krich, Carl Charles	I.C.
Kirsh, Mary	M.D.	B.S. 1944, College University of Iowa	
Kirshner, Elizabeth Grace	I.C.	Krich, John John	M.D.
B.S. 1941, Kent State University		Krich, Robert	M.D.
Kirshner, Carl Joseph	I.C.	A.B. 1941, University of Massachusetts	
B.S. 1942, University of California		Krich, Stanley	I.C.
Washington University		Krich, Stanley	V.
Kirshner, Helen	I.C.	Krich, Joseph Paul	M.D.
Kirshner, William Stanley	M.D.	Krich, George	I.C.
Kirshner, David	I.C.	Krich, George	I.C.
Kirshner, Arthur	I.C.	A.B. 1940, A.M. 1941, University	
B.S. 1941, University of Minnesota		of Minnesota	
Kirshner, Frank William	V.	Krich, Mary Mary	I.C.
Kirshner, Robert	I.C.	Krich, William	V.
Kirshner, William David	V.	Krich, William	I.C.
B.S. 1940, Cornell College		A.B. 1941, Washington College	
Kirsh, Clifford Paul	N.I.	Krich, William R.	I.C.
Kirsh, John Edgar	M.D.	Krich, Frank	I.C.
Kirsh, William James	D.C.	Krich, William	I.C.
B.S. 1941, University of Massachusetts		Krich, Robert Louis	I.C.



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Students Registered

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Larner, Carolyn Braxton	Va	Larner, Robert Bruce, Jr.	N.Y.
Larner, Patricia Price	Va	Larson, James Warren, Jr.	D.C.
A.B. 1957, University of Alabama		Larson, Julius Homer	D.C.
Larson, Anne Gilliam	Va	A.B. 1957, Cornell College	
A.B. 1958, University of California		Larson, Frank John	N.Y.
Los Angeles		A.B. 1957, California University	
A.M. 1957, University of California		Larson, Rose Florence	D.C.
Los Angeles, Frank Allen	Va	Larson, William Augustus, Jr.	N.C.
L.S. 1957, Montana State College		A.B. 1957, Wake Forest College	
Louis, Charles Ernest	I.C.	Larson, Robert William	Va
Louis, Robert Clark	Va	A.B. 1957, Washington University	
Louis, Theodore Martin	Va	L.B. 1954, University of Colorado	
Louis, Gustave	Me	Larson, John R.	D.C.
Louis, Vincent Lee	D.C.	Larson, Florence Schatz	D.C.
B.M.E. 1957, University of		A.B. 1957, Northwestern University	
Washington		M.S. 1954, University of Chicago	
L.P. 1957, Francis Gerald	D.C.	Larson, Anna Catherine	Me
Lepinski, Marjorie Mordenski	Me	A.B. 1957, Johns Hopkins University	
L. Pinner, Joseph Claude	Me	Larson, Richard Maurice	Conn.
A.B. 1957, University of Maine		Larson, John	N.J.
Letcher, Catherine Cecilia	Va	Larson, John David	Va
Letcher, Vincent Lee	Me	Larson, Joseph H.	D.C.
A.B. 1957, Washington College		B.S. 1957, Oklahoma City University	
Lewis, Paul K.	S.D.	Larson, John	D.C.
A.B. 1957, U.S. 1957, University of		Larson, William Edmund	N.Y.
South Dakota		B.S. 1957, Montana State University	
Lewis, John Jay	D.C.	Latta, Fred William	Va
B.S. 1957, Catholic University		B.S. 1957, New York	
of America		Latta, Margaret Ann	D.C.
Lewis, John Herbert	D.C.	Latta, Robert James	Va
Lewis, Joseph Hutton	D.C.	A.B. 1957, American University	
Lewis, John Henry	Va	Law, John Vernon	Va
Lewis, Roger Augustus III	Me	B.S. 1957, West College	
B.S. 1957, M.A. 1957, Ph.D. 1957,		Law, Monte Francis	D.C.
Howard University		A.B. 1957, A.M. 1957, West Virginia	
Lewis, Jack	D.C.	Laws, Philip Mary	Va
A.B. 1957, Princeton University		B.S. 1957, The George Washington	
A.M. 1957, University of Maryland		University	
L.H. 1957, The George Washington		Laws, Thomas Jerome	Me
University		Laws, George	Me
Lewis, John Louis	Va	A.B. 1957, South College	
Lewis, Mary Helen	Neb.	Lawson, Samuel Robert	Va
Lewis, Mary Ann	Me	B.S. 1957, M.S. 1957, Massachusetts	
Lewis, Vincent Francis	Me	Lawson, William	
Charles Howard	Va	Lawson, Harry Eugene	D.C.
A.B. 1957, Howard University		Lawson, James William	Va
Lewis, John Michael	Va	A.B. 1957, University of Denver	
Lewis, Earl Kent	Me	Lawson, William Earl	D.C.
Lewis, Leonard J.	Va	Lawson, John Earl	Wash.
A.B. 1957, Washington College		B.S. 1957, U.S. Naval Academy	
Lewis, Paul Francis	Me	L.H. 1957, The George Washington	
Lewis, Walter Julius	Va	University	
A.B. 1957, The George Washington		Lawson, Marion Charles	D.C.
University		B.E.E. 1957, Penn. State	
L.P. 1957, John Jay	Va	Lawson, Raymond Miles	Va
B.S. 1957, Virginia Polytechnic		Lawson, Dorothy Ruth	Va
Institute		Lawson, Howard Eugene	Va
L.P. 1957, Arizona State School		A.B. 1957, A.M. 1957, The George	
Lewis, Mary Virginia	D.C.	Washington University	
Lewis, John William	Me	Lawson, Richard Francis	Va
Lewis, John Wynn	Me	Lawson, Rose Allen	Pa.
Lewis, Herman Vincent	Me	Lawson, William Joseph	Me
Lewis, Philip	Pa.	A.B. 1957, Brown University	
Lewis, James William	D.C.	M.S. 1957, University of Maine	
Lewis, Lark	D.C.	Lew, John Daniel	Va
Lewis, George Haskar	D.C.	Lew, Walter Francis	D.
Lewis, Richard Carroll	Va	C.E. 1957, Pennsylvania Military	
Lewis, Rose J. Gordon	Me	College	
Lewis, John	N.Y.	Laxton, Michael Jay	D.C.
Lewis, Monroe Woods	Va	Laxton, Philip	D.C.
A.D. 1957, Queens College		Lazar, Donald Joseph	Me
Lewinson, Francis Malvern	D.C.		
Lewinson, Roy Sam	D.C.		
Lutz, Alois, Jr.	Va		



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## Students Registered

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[illegible]

Lees, Patricia F.	MI	Leis, John Arthur	MI
A.B. 1931, Harvard University		B.S. 1914, Cornell College	
A.M. 1933, New York University		Lewis, Arnold A.	Conn
Lewis, Raymond Charles Jr.	MI	Lewis, Milton Eugene	Va
B.S. 1933, University of Wisconsin		A.B. 1935, Washington University	
Lewis, Robert Allen	Miss	A.M. 1941, Johns Hopkins University	
B.S. 1931, Ohio State College		Lindberg, Samson	Mass
Lewis, Robert Wayne	Va	B.S. 1927, Cornell University	
Lewis, William H. Hall	N.C.	Lindle, Richard Kane	Va
B.S. 1931, University of North Carolina		Lindsay, Percy Williamson	Va
Lewiston, Walter Howard	Mass	Lindstrom, Eric William	MI
Leyburn, John Oswald	Va	B.S. 1933, Marquette State University	
Leyburn, John, Jr.	Pa	Lindsay, Gordon Patricia	Pa
B.S. 1938, U.S. Naval Academy		Lindsay, Jonathan	
M.S. 1941, Columbia Institute of Technology		A.B. 1936, The George Washington University	
Li, Yung-Mei	D.C.	Lindsay, Frank Westside	MI
Lien, George K. C.	D.C.	Lindsay, Charles Vernon	Va
Lienow, David Martin	D.C.	Lindsay, Jonathan Arnold	Va
Lilly, Donald Joseph	Ohio	Lindsay, Thomas Francis	MI
B.S. 1936, Georgetown University		Lindsay, Alfred Everett	Va
Linnard, George	Ill.	Linsmeier, Raydon Francis	N.Y.
Linnard, Ann Stephen	Ill.	Linsley, David Edgar	
Lippy, Howard Rex	MI	A.B. 1934, Southern College	N.Y.
B.S. in M.S. 1936, University of Maryland		Linsley, Percy in Ford	
Lipscomb, Leonard Stanley	MI	A.B. 1934, Mount Holyoke College	
B.S. 1931, University of Illinois		Lissner, Ivan Thomas	Pa
Litlick, David Louis	Pa.	A.B. 1935, The George Washington University	
Litman, Herbert	D.C.	Litman, David Wyckoff	Va
A.B. 1936, Rutgers College		B.S. 1936, The George Washington University	
Livett, Warren James	Ind.	Livett, John	N.Y.
A.B. 1935, University of Notre Dame		Liu, Fung-Ling	Ind.
A.M. 1937, Columbia University		A.B. 1931, A.M. 1941, Princeton University of Chicago	S.C.
Livings, William Frederick	Va	Liu, James Joseph	Conn
A.B. 1935, Trinity College		Liu, James Michael	
Liv, George H.	MI	B.S. 1935, University of Minnesota	Va
Livshitz, George William	MI	Livins, Harry Monroe	
Livshitz, David Nathan	MI	B.S. 1936, Virginia Polytechnic University	
A.B. 1937, Western Michigan U. Western		M.S. 1939, A.M. 1941, University of Maryland	Va
Livshitz, Eugene Aaron Jr.	Ind.	Livins, Paul Edwin	D.C.
Ph.D. 1939, Cornell	Conn	Livins, David Lee	Ind.
A.B. 1935, University of Colorado		Livins, Emma Taylor	Va
Livins, William Maria	Va	Liv, Albert Thomas	Ind.
Livins, William Joseph	Va	Liv, Michael	
Livins, John William	Va	B.S. 1947, University of Pennsylvania	Ind.
Livins, William Lee	MI	Livins, Walter Bryan	MI
B.S. in M.E. 1952, Missouri School of Mines		Livins, Robert Joseph	Conn
Livshitz, Gladys Warren	Va	Livins, George Milton	Va
Livshitz, Laura Mary	Va	Liv, Edgar	
Livshitz, Roger B.	Mass	A.B. 1936, Temple University	
Ph.D. 1950, Philadelphia	MI	A.M. 1938, University of Pennsylvania	Wash
M.S. in E.E. 1953, University of Pennsylvania		Livins, Carl Stanley	
Liu, Chien Tsao	Korea	B.S. 1931, Washington State College	D.C.
B.S. 1937, National University, Korea		Livins, Harold	Ind.
Liu, Hsin-Yue	Korea	Livins, James	Ind.
Liu, Tsao Tsung-tzu	D.C.	Livins, Nathan Jay	Va
Liu, Hsin-Yue	MI	Livins, Raymond Bradford	
B.S. 1936, Arizona University		B.S. 1934, Southern University	D.C.
A.M. 1941, The George Washington University		Livins, Richard John	
Livins, Joseph	D.C.	A.B. 1935, M.B. 1937, New York University	D.C.
Ph.D. in Epidemiology 1956, University of Naples, Italy		Livins, George Hugh	Ohio
Liv, George	D.C.	Livins, Melvin Anne	
Livins, David C.	Va	B.S. in Ed. 1933, Youngstown	MI
Livins, David Morrison	Pa.	Liv, William Oswald	D.C.
B.S. 1934, Hiram College		Liv, Frederick Emerson	
Liv, Carl Joseph	Texas	B.S. 1937, Western Teachers College	MI
A.B. 1939, B.S. 1941, M.B. 1944, M.D. 1946, University of Minnesota		Liv, John, Thomas	







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### Systemic Response

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O'Brien, Kathleen Ann	ME	O'Brien, Alfred Ann	Va
O'Brien, Louis B. II	Iowa	O'Brien, John E. Jr.	ME
B.S. in C.E., 1936, Iowa State College		O'Brien, John E. Jr.	ME
O'Brien, Philip Joseph	Ohio	O'Brien, John E. Jr.	ME
B.S. in Met. E., 1938, Purdue University		O'Brien, John E. Jr.	ME
O'Brien, Francis Deane	Pa.	O'Brien, John E. Jr.	ME
B.S. in M.E., 1938, University of Pennsylvania		O'Brien, John E. Jr.	ME
O'Brien, Frank A. Rogers, Jr.	Va.	O'Brien, John E. Jr.	ME
O'Brien, Robert Earl	N.C.	O'Brien, John E. Jr.	ME
B.S., 1935, University of Maryland		O'Brien, John E. Jr.	ME
O'Brien, Francis George	ME	O'Brien, John E. Jr.	ME
A.B., 1932, University of Maryland		O'Brien, John E. Jr.	ME
O'Brien, James David	Mass.	O'Brien, John E. Jr.	ME
B.S. in P.S., 1932, Germantown, Pennsylvania		O'Brien, John E. Jr.	ME
O'Brien, John Malcom	Pa.	O'Brien, John E. Jr.	ME
O'Brien, Joseph Patrick, Jr.	Va.	O'Brien, John E. Jr.	ME
O'Brien, John	D.C.	O'Brien, John E. Jr.	ME
O'Brien, John Joseph	D.C.	O'Brien, John E. Jr.	ME
B.S., 1938, State Hall University		O'Brien, John E. Jr.	ME
O'Brien, Joseph Thomas	Va.	O'Brien, John E. Jr.	ME
B.S., 1938, University of Maryland		O'Brien, John E. Jr.	ME
O'Brien, Mary Ellen	Va.	O'Brien, John E. Jr.	ME
O'Brien, Edward Joseph	Va.	O'Brien, John E. Jr.	ME
A.B., 1938, Northwestern University		O'Brien, John E. Jr.	ME
O'Connell, Michael Thomas	Conn.	O'Brien, John E. Jr.	ME
A.B., 1938, Trinity College		O'Brien, John E. Jr.	ME
O'Connell, Patrick A. Ann	Va.	O'Brien, John E. Jr.	ME
O'Connell, John Joseph	Mass.	O'Brien, John E. Jr.	ME
O'Connell, Charles Eugene	Wash.	O'Brien, John E. Jr.	ME
B.S., 1938, Washington State College		O'Brien, John E. Jr.	ME
O'Connell, Donald Edward	Va.	O'Brien, John E. Jr.	ME
O'Connell, Donald Martin	Va.	O'Brien, John E. Jr.	ME
O'Connell, John James	ME	O'Brien, John E. Jr.	ME
B.S. in Eng., 1938, New York State College of Engineering		O'Brien, John E. Jr.	ME
O'Connell, John Joseph	Va.	O'Brien, John E. Jr.	ME
O'Connell, Mary Joseph	Va.	O'Brien, John E. Jr.	ME
O'Connell, Robert Joseph	D.C.	O'Brien, John E. Jr.	ME
O'Connell, Robert Joseph	D.C.	O'Brien, John E. Jr.	ME
O'Connell, William Thomas, Jr.	R.I.	O'Brien, John E. Jr.	ME
A.B., 1938, Brown University		O'Brien, John E. Jr.	ME
O'Connell, Alexander	D.C.	O'Brien, John E. Jr.	ME
O'Connell, William Joseph, Jr.	ME	O'Brien, John E. Jr.	ME
A.B., 1938, University of North Carolina		O'Brien, John E. Jr.	ME
O'Neil, Mary Catherine	Nev.	O'Brien, John E. Jr.	ME
O'Neil, John Deane	Ill.	O'Brien, John E. Jr.	ME
B.S., 1944, U. S. Naval Academy		O'Brien, John E. Jr.	ME
O'Neil, John Deane		O'Brien, John E. Jr.	ME
M.S., 1942, University of California at Los Angeles		O'Brien, John E. Jr.	ME
O'Neil, Mary Louise	D.C.	O'Brien, John E. Jr.	ME
A.B., 1938, The George Washington University		O'Brien, John E. Jr.	ME
O'Neil, Mary Louise	Calif.	O'Brien, John E. Jr.	ME
O'Neil, Charles William	ME	O'Brien, John E. Jr.	ME
O'Neil, James William	Mass.	O'Brien, John E. Jr.	ME
O'Neil, Michael Charles	Va.	O'Brien, John E. Jr.	ME
O'Neil, William Joseph, Jr.	Va.	O'Brien, John E. Jr.	ME
O'Neil, Virginia Gordon	ME	O'Brien, John E. Jr.	ME
O'Neil, Virginia Gordon	Va.	O'Brien, John E. Jr.	ME
O'Neil, Virginia Gordon	Nev.	O'Brien, John E. Jr.	ME
O'Neil, Virginia Gordon	D.C.	O'Brien, John E. Jr.	ME
O'Neil, Virginia Gordon		O'Brien, John E. Jr.	ME
B.S.E., 1938, M.S.E., 1941		O'Brien, John E. Jr.	ME
Edward C. Palmerston Institute		O'Brien, John E. Jr.	ME
O'Neil, Mary	Va.	O'Brien, John E. Jr.	ME
A.B., 1938, The George Washington University		O'Brien, John E. Jr.	ME
O'Neil, Harold	Ark.	O'Brien, John E. Jr.	ME
B.S., 1938, University of Arkansas		O'Brien, John E. Jr.	ME
O'Neil, Carl	D.C.	O'Brien, John E. Jr.	ME

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1. W. J. ...	MA	2. ...	MA
2. ...	MA	3. ...	MA
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99. ...	MA	100. ...	MA



Powell, Sally Lou			
A.B. 1942, Georgia State College for Women			
A.M. 1945, The George Washington University			
Powell, William Arnold			
A.B. 1931, Ohio Wesleyan University			
A.M. 1934, Washington University			
Powell, William Maurice			
B.S. 1931, University of Missouri			
Powell, William Talmadge, Jr.			
B.S. 1934, U. S. Naval Academy			
Powers, Harry Connel			
A.B. 1941, Cornell University			
Powers, John Francis			
Powers, Mary F.			
B.S. 1936, West Liberty State Teachers College			
Powers, Ruth Jeanne			
Powers, Henry Louise			
Powers, Jessica Marjorie			
Powers, Vicki Jean			
Powledge, Kenneth Mayville			
Powles, Wynne James			
Prach, Elsie Bales			
Prach, John Stanley			
B.S. 1934, The George Washington University			
Prado, Simon Mariano			
Pratt, Safford Nash			
Bachelor of Medicine and B.S. 1915, Columbia University			
Pratt, Thomas			
B.S. 1918, University of Maryland			
Pratt, Arthur			
Praeger, William Joseph			
Pratt, Mary Jane Elizabeth			
Pratt, George Joseph			
B.S. 1936, University of Maryland			
Pratt, Dorothy Corine			
Pratt, Edward Maurice			
Pratt, Rhoda Egle			
Pratt, Harry Benjamin			
Pratt, Maurice			
B.S. 1938, Worcester Polytechnic Institute			
Pratt, Jerry Maurice			
B.E. 1931, New York University			
Pratt, Harry			
A.B. 1941, Cornell University			
Pratt, Alice Florence			
A.P. 1936, The George Washington University			
Pratt, Glad Jean			
Pratt, Edna Louise			
Pratt, James Sayre			
Pratt, John William			
Pratt, Kenneth Anthony			
Pratt, William W.			
B.S. 1931, Northeast University			
Pratt, Joseph Thomas			
Pratt, Robert G.			
B.S.A. 1941, College of the City of New York			
New York City, Massachusetts Institute of Technology			
Pratt, Florida Edward			
Pratt, Donald Lee			
Pratt, Stuart A. Jr.			
A.S. 1936, University of Alabama			
Pratt, Stella Jane			
Pratt, Leon Carl			
A.B. 1934, Delta College			
Pratt, Richard Aymar			
Pratt, Albert Bennett			
Pratt, Carl Anthony			
Pratt, Marion Estelle			
Pratt, Sarah Margaret			
A.B. 1937, Pennsylvania University			
Pratt, John August			
Pratt, Robert James			
Pratt, Robert James			
B.S. 1936, Maryland State College			
Pratt, Frederick Joseph, Jr.			
B.S. 1936, Temple University			
Pratt, John University of Maryland			
Pratt, Donald Garfield			
B.S. 1934, University of Florida			
Pratt, Henry Marshall			
A.B. 1935, M.S. 1937, Howard University			
Pratt, Dorothy Suzanne			
A.B. 1938, Howard University			
A.M. 1940, New York University			
Pratt, James William II			
Pratt, Luc V.			
B.S. 1935, Hampton Institute			
A.M. 1939, Columbia University of America			
Pratt, Muri T.			
Pratt, Robert Paul			
B.S. 1936, University of Maryland			
Pratt, Philip Peter			
A.B. 1931, University of Miami			
B.S. 1936, D.C. University of Miami			
Pratt, Ambrose Edward			
B.S. 1935, Massachusetts Institute of Technology			
Pratt, John Andrew			
Pratt, John, Linda Davis			
Pratt, Richard John			
Pratt, William Nelson			
Pratt, Maria Rose			
Pratt, Milda W.			
Pratt, Joseph Benjamin			
B.S. 1937, Wayne University			
Pratt, William			
A.M. 1931, Ph.D. 1934, The George Washington University			
Pratt, Nathan Lee			
A.B. 1936, Brown University			
Pratt, Kenneth John			
B.S. 1931, U. S. Naval Academy			
Pratt, Robert			
Pratt, E. Henry			
B.S. 1936, E. 1937, Washington University			
Pratt, Joseph			
B.S. 1936, The George Washington University			
Pratt, Harry Bruce			
B.S. 1936, D.C. Teachers College			
Pratt, James Lawrence			
Pratt, George J.			
B.S. 1936, University of Maryland			
Pratt, John			
Pratt, John			
E.A. 1936, North Carolina School of Music and Technology			
Pratt, Joseph Simon, Jr.			
Pratt, Robert Joseph			

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See, Ruth Young	Va	Seeley, Edward Elgin	Ind.
A.B. 1948, Ohio Wesleyan University		Education in Law and Social Science	
Seeley, Alexander	D.C.	1946, North Central University	M.
Seeley, George Lewis	N.Y.	Seeley, Robert Earl	
A.B. 1949, Lafayette College		A.B. 1947, The George Washington	
Seeley, John Louis	Va	University	N.J.
B.S. 1949, Cornell University		Seeley, Thomas Eugene	M.
Seeley, Philip Samuel	Pa	Seeley, Donald James	
Seeley, Joseph Anthony	N.J.	B.S. 1941, Montana State University	
B.S. 1941, Webb Institute of Naval		Seeley, Louis	
Architecture		A.P. 1949, Fordham College	
Seeley, Richard Allen	D.C.	A.M. 1950, New York University	
Seeley, John J. Lewis	Va	Seeley, Roy Lee	
Seeley, William Charles	Md	Seeley, Joseph	
Seeley, Michael Anthony, Jr.	N.J.	Seeley, Harold Joseph	
Seeley, Richard Hugh	Only	Seeley, Harold Joseph	
Seeley, Eugene Robert	D.C.	Seeley, Charles Arthur	
Seeley, Eugene Andrew	D.C.	Seeley, Charles Arthur	
B.S. 1946, University of Puerto Rico		Seeley, Charles Arthur	
Seeley, Herbert Rufus	Ga	Seeley, Charles Arthur	
Seeley, Jack Samuel	Md	Seeley, Charles Arthur	
A.B. 1941, The George Washington		Seeley, Charles Arthur	
University		Seeley, Charles Arthur	
Seeley, Robert Francis	Mont.	Seeley, Charles Arthur	
A.B. 1941, University of		Seeley, Charles Arthur	
Vanderbilt		Seeley, Charles Arthur	
Seeley, William A.	D.C.	Seeley, Charles Arthur	
L.B. 1941, Columbia University		Seeley, Charles Arthur	
A.B. 1941, University of California		Seeley, Charles Arthur	
at Los Angeles		Seeley, Charles Arthur	
Seeley, Mark Howard	D.C.	Seeley, Charles Arthur	
Seeley, Murray Allen	D.C.	Seeley, Charles Arthur	
Seeley, Park Elmer	Md	Seeley, Charles Arthur	
Seeley, Samuel	D.C.	Seeley, Charles Arthur	
Seeley, Walter Edgar	Md	Seeley, Charles Arthur	
Seeley, William	D.C.	Seeley, Charles Arthur	
Seeley, John Jay	D.C.	Seeley, Charles Arthur	
Seeley, Kenneth Thomas	Md	Seeley, Charles Arthur	
A.P. 1941, Lincoln College		Seeley, Charles Arthur	
M.S. 1941, Columbia University		Seeley, Charles Arthur	
Seeley, Lawrence John	D.C.	Seeley, Charles Arthur	
Seeley, Robert Henry	N.Y.	Seeley, Charles Arthur	
B.S. 1941, Columbia		Seeley, Charles Arthur	
University		Seeley, Charles Arthur	
Seeley, Harry Carraway	Va	Seeley, Charles Arthur	
Seeley, Kathleen Emma	D.C.	Seeley, Charles Arthur	
Seeley, Evelyn Ann	D.C.	Seeley, Charles Arthur	
A.B. 1941, Bible College		Seeley, Charles Arthur	
Seeley, Paul Ann	D.C.	Seeley, Charles Arthur	
Seeley, Ralph Allen	Md	Seeley, Charles Arthur	
B.S. 1941, University of Maryland		Seeley, Charles Arthur	
Seeley, William Arthur	Va	Seeley, Charles Arthur	
Seeley, Mary Ann	Md	Seeley, Charles Arthur	
Seeley, Walter Eugene	D.C.	Seeley, Charles Arthur	
Seeley, Charles Keith	Va	Seeley, Charles Arthur	
Seeley, George Washington	Md	Seeley, Charles Arthur	
Seeley, John Anthony	D.C.	Seeley, Charles Arthur	
Seeley, George Andrew	D.C.	Seeley, Charles Arthur	
A.B. 1941, Pennsylvania University		Seeley, Charles Arthur	
Seeley, Helen Louise	D.C.	Seeley, Charles Arthur	
A.B. 1941, Pennsylvania University		Seeley, Charles Arthur	
Seeley, Herbert LeRoy	N.C.	Seeley, Charles Arthur	
Seeley, Joseph	Va	Seeley, Charles Arthur	
A.B. 1941, The George Washington		Seeley, Charles Arthur	
University		Seeley, Charles Arthur	
Seeley, Michael Edward	Ind.	Seeley, Charles Arthur	
Seeley, Stephen Edward	Va	Seeley, Charles Arthur	
A.B. 1941, The George Washington		Seeley, Charles Arthur	
University		Seeley, Charles Arthur	
Seeley, William Harvey	D.C.	Seeley, Charles Arthur	
Seeley, John J.	Va	Seeley, Charles Arthur	
B.S. 1941, East Tennessee State		Seeley, Charles Arthur	
College		Seeley, Charles Arthur	





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Thatcher, Gordon S. Moore	Edin	Thompson, Edwin Mayne	M
B.S. 1913, Rhode College		B.S. in Eng. 1915, Agricultural	
Thatcher, Leland Lincoln	M	of Mass. and Maryland	
B.S. 1914, University of Minnesota		Thompson, Charles Way	
Thaw, Stephen Archer	M	A.B. 1915, College of Commerce	
Thayer, Jane Hall	Va	Thompson, Donald M. Moore	
A.B. 1912, Cornell University		A.B. 1911, The George Washington	
Thayer, Leola Corina	Va	Univ.	
Thayer, Mary Susan	Va	Thompson, Edwin Arthur	
Thayer, Patricia Emma	N.H.	B.S. in Ch.E., B.S. in N.S. and	
Thayer, Richard Arthur	D.C.	Thayer, 1919, Princeton University	
B.S. 1919, University of Maryland		Thompson, Elizabeth Clegg	
Thayer, Patricia Anne	D.C.	Thompson, Ethel Amelia	
Thompson, Edna	D.C.	Thompson, Gladys Irene	
Thorp, Vera Marie	D	Thompson, James Howard	
Thorp, Lucine	D	Thompson, Jane Margaret	
B.S. 1918, University of Maryland		Thompson, Marion Pauline	
Thorp, Glad Delane	M	Thompson, Mary Elizabeth	
Thompson, Helen M. Hall	M	Thompson, Mary Jo	
B.S. 1919, Georgetown University		Thompson, Mabel Paul	
Thompson, Kenneth Paul	Va	Thompson, Nancy Langston	
B.S. 1917, U.S. Military Academy		Thompson, Oscar Clayton	
Thompson, Van John	D.C.	Thompson, Robert William	
Thomson, Andrew Lawrence	M	Thompson, Sam DeLong	
Thomson, Catherine Olivia	Va	Thompson, William Edgar	
Thomson, Lloyd Lloyd	Va	Thompson, Vera Eileen	
Thomson, Pauline Antonette	D.C.	B.A. 1919, California University	
Thomson, Pauline Elizabeth	N.J.	Thompson, Walter Eugene	
A.B. 1911, Washington and Lee		Thompson, William	
University		B.S. 1911, Tulane University	
Thomson, Vera Lynn	M	Thompson, William Franklin	
Thomson, George Hall	D.C.	Thompson, William Walter	
B.S. 1911, Saint George's College		Thompson, A. Bruce	
Thomson, Henry Evans	Va	Thompson, Louis Eugene	
Thomson, Jack Lynn	Va	B.A. 1917, A.M. 1919, University	
Thomson, James George	Ohio	of Louisiana	
Thomson, James Delia J.	D.C.	Thomson, Nance Barbara	
B.S. 1917, Tennessee State College		Thomson, Robert Morgan	
Thomson, James Rogers	D	Thomson, Samuel	
B.S. 1919, Columbia University		Thomson, Joseph George	
Thomson, John James	Va	B.S. 1911, University of North Carolina	
May 1917, Columbia University's		Thomson, John Moore	
Journal		Thomson, William Art	
May 1917, Northwestern University		Thomson, Ralph Robert	
Thomson, John George	M	B.S. 1915, St. Andrews's College	
B.A. 1914, University of Miami		A.M. 1917, Glasgow University	
Thomson, Kyle Lewis	M	Thomson, James William	
Thomson, Lynn Monroe	Va	A.B. 1914, Michigan State University	
Thomson, Madison Ann	M	Thomson, Joseph Benjamin	
Thomson, Mary Annie	Ohio	B.S. 1911, U.C. Columbia College	
A.B. 1911, Texas Technological		Thomson, Martha Edna	
College		A.B. 1911, Howard University	
Thomson, Norman Eugene	Va	Thomson, Valery	
Thomson, Raymond Edward	D.C.	Thomson, Arthur Nicholas	
A.B. 1919, The Johns Hopkins		B.S. 1917, Wayne Theological Institute	
University		Thomson, Edward George	
Thomson, R. H. of Miami	M	Thomson, Fred Everett	
B.S. 1911, U.S. Naval Academy		A.B. 1911, Vassar College	
Thomson, Richard Benjamin	W	Thomson, Vernon Elin	
Thomson, Robert William	D	A.B. 1914, Harvard College	
B.S. 1911, U.S. Naval Academy		A.M. 1917, Columbia University	
B.S. 1911, M.C.P. 1913, Remondin		Thomson, Frank Edward	
University		A.B. 1911, Wayne Theological	
Thomson, Robert James	M	Thomson, James Clinton	
Thomson, Robert Hamilton	D.C.	Thomson, Joseph Anne	
Thomson, Virginia Helen	Va	Thomson, William E.	
Thomson, Vincent Carl E.	K	A.B. 1911, Washington State	
A.B. 1911, College of Arts		Thomson, William Andrew	
University		Thomson, Paul Marion	
Thomson, Virginia Grace	Va	Thomson, Anne Jane	
Thomson, William Clarence	D.C.	A.B. 1917, Ontario University	
		A.M. 1918, Northwestern University	





Tolson, Emilio		Tolson, Milton	
B.S. 1933, National University		B.S. 1933, Pennsylvania State	
Philosophy		University	
M.E. 1935, University of the		Toulson, Richard Clement	VA
Philosophy		A.B. 1936, Kansas State Industrial	
B.S. in P.S. 1936, Georgetown		College, Lawrence	
University		Towler, Mary E. Smith	ME
Towner, Richard Vernon	D.C.	A.B. 1919, The George Washington	
Town, Myrtle K.	PA	University	
Trotter, Gertrude Hall	D.C.	Towler, Thomas Clarence, Jr.	ME
Trott, Myra L.	MA	B.S. in S.A. 1945, New York	
Trounch, Maria Lavigne	VA	University	
Trounch, Robert Henry	MA	Town, Harriet Alice	VA
Trounch, Donald R.	VA	A.B. 1923, Wayne University	
A.B. 1947, Ph.D. 1949, Stanford		Townsend, Vincent Graham	D.C.
University		A.B. 1915, The George Washington	
A.M. 1949, Yenching University,		University	
China		Townsend, William Jennings	D.C.
Trow, Henry	ME	A.B. 1906, The George Washington	
S.S. 1916, Brooklyn College		University	
Tucker, Edward Lane	MA	Townsend, Frank Philip	S.D.
A.B. 1934, Tufts College		A.B. 1936, University of Maryland	
Tucker, William Nelson	CA	Town, Frederick Gerald	VA
A.B. 1914, Connecticut College		A.B. 1916, The George Washington	
Tucker, Patricia Ann	D.C.	University	
Tuckman, Lloyd	VA	Town, Richard George	VA
T.D. 1946, Boston University		T.D. 1944, University of New	
Tuckwell, William James	ME	Hampshire	
Tuckwell, Alice (Gardner)	S.D.	Townsend, Charles Henry	D.C.
Tucker, Robert Lee, Jr.	MA	A.B. 1916, The George Washington	
A.B. M.A. 1931, The Institute		University	
Washington University		Town, Robert Henry	VA
Tucker, Sidney William	VA	Town, John	MA
A.B. 1915, LL.B. 1918, University		Town, Nancy Ann	VA
of Minnesota		Townsend, Gordon James	N.H.
Tunny, Evelyn Gerald	ME	Townsend, Elizabeth Arden	VA
B.L. in Ed. 1914, Syracuse University		Townsend, William Monroe	
Tunny, John Norman	ME	A.B. 1911, English University	
A.B. 1924, University of Maryland		Townsend, William Monroe	D.C.
Tupper, Philip Monroe	N.Y.	Town, Sidney Carl	VA
Trotter, Stephen Roger	MA	A.B. 1915, University of Minnesota	
Tyler, Donald Robert	D.C.	Tow, Thomas Wayne	VA
B.S. 1935, University of Maryland		Tow, Margaret Ellen	VA
Tyler, Richard Edmund	N.Y.	Townsend, William Monroe	VA
B.S. 1935, College of the Holy Cross		A.B. 1915, University of Wisconsin	
Tyler, David Kenneth	D.C.	Townsend, Gordon James	VA
Tyler, William Wayne	VA	Townsend, John Paul	VA
Tyler, Robert Lee	MA	B.S. in Ed. 1915, B.S. in Eng. 1917,	
B.S. 1935, University of Maryland		University of Idaho	
Tyler, George	VA	Townsend, William Paul	VA
Tyler, Norman D.	VA	Tow, John Halley	ME
H.B. 1916, LL.M. 1917, The George		Tow, Thomas Monroe	VA
Washington University		Tow, William Monroe	VA
Tyler, William Robert	D.C.	Townsend, Paul Joseph	VA
Tyler, George	D.C.	Tow, Gerald S.	MA
Tyler, Paul Joseph	MA	Townsend, William Monroe	VA
Tyler, John McKee	D.C.	Tow, Yon Chai	MA
A.B. 1920, Washington University		Tow, George	MA
Tyler, John Hamilton	MA	Townsend, William Monroe	VA
Tyler, Kenneth Dale	MA	Townsend, William Monroe	VA
B.S. 1926, Boston University		Tow, John Halley	ME
Tyler, Richard Lewis, Jr.	VA	Tow, Thomas Monroe	VA
A.B. 1926, University of North		Tow, William Monroe	VA
Carolina		Tow, Paul Joseph	VA
Tyler, Kendall Hugh	MA	Tow, Gerald S.	MA
B.S. 1931, Florida University		Tow, William Monroe	VA
Tyler, Edward George, Jr.	VA	Tow, John Halley	ME
B.S. in M.E. 1921, Virginia		Tow, Thomas Monroe	VA
University		Tow, William Monroe	VA
Tyler, Paul Ernest	MA	Tow, John Halley	ME
Tyler, Ross Vincent	VA	Tow, Thomas Monroe	VA
Tyler, Herbert Lawrence	R.I.	Tow, William Monroe	VA
A.B. 1918, Harvard University		Tow, John Halley	ME

[illegible]





[illegible]

Walker, Dime Leah	Va.	Walsh, Edmond John	Va.
A.B. 1926, Wesley College		B.S. & M.A. 1928, Lehigh University	
Walker, Edward Frazier, Jr.	Va.	Walsh, Gerald Edward	Mch.
Walker, Ernest Carroll	Md.	Walsh, John Patrick	Va.
A.B. in Govt. 1915, The George Washington University		B.S. in Ed. 1919, New York State Teachers College, Buffalo	
Walker, Emma Jay Louisa	Va.	M.S. in Ed. 1920, Cornell University	Va.
Walker, Robert Morgan	Md.	Walsh, John Patrick	
B.S. 1916, Van Tennessee State College		B.S. 1920, University of Illinois	
Walker, Hal Tall	A'a	A.M. 1921, Catholic University of America	
B.S. in E.E. 1913, University of Arizona		Ed.D. 1918, Chicago University	
Walker, Harry Smith	Va.	Walsh, Joseph Patrick	Va.
A.B. 1916, Western Maryland College		P.E.E. 1921, Manhattan College	Va.
Walker, James Franklin	N.C.	Walsh, Martin Edmund	
B.S. 1920, Hampton Institute		A.B. 1921, Washington College	
Walker, Jess Henry	D.C.	A.M. 1921, University of Virginia	
Walker, Jess Jennings	Pa.	Walsh, R. M.	Va.
Walker, John R. 1901	Md.	Walsh, William Richard	D.C.
B.S. 1901, Georgetown University		Walsh, Charles Frederick	Calif.
Walker, John William	D.C.	A.B. 1901, University of California at Los Angeles	
Walker, Louis E.	Ky.	A.M. 1901, University of Iowa	
A.B. 1914, Mount St. Joseph College		Walsh, Donald Oliver	Calif.
Walker, Nathy	Fla.	Walsh, Francis College	
Walker, Nancy Anne	N.C.	Walsh, Hamilton Ave.	Md.
A.P. 1913, University of North Carolina		A.B. 1914, Western Maryland College	
Walke, Ole Hassman	Md.	Walsh, Robert R. 1913	D.C.
B.S. 1913, Maryland State Teachers College, Salisbury		B.S. 1913, University of Pennsylvania	
Walker, Raymond Francis	D.C.	Walsh, Tom Eugene	Md.
Walker, Richard Bruce	N.H.	Walsh, Victor John	D.C.
B.S. 1913, University of Iowa		Walsh, John Luke	Pa.
Walke, Ross Berle	Va.	Walsh, Margaret Ella	Va.
A.B. 1901, Colby College		Walsh, Maria Paul	
Walker, Robert Thomas, Jr.	Md.	B.S. & M.E. 1914, Lehigh University	Md.
Walker, Suzanne William	D.C.	Walsh, Rita William	Md.
Walker, Walter Anthony	Va.	Walsh, Mary Smith	
Walker, William Elmer	Md.	B.S. in Ed. 1901, Concord College	N.Y.
Walsh, Charles Henry	Conn.	Walsh, Vera Mary	
Walsh, Joseph Louis	Mass.	A.B. 1901, A.M. 1901, University of Chicago	
B.S. 1901, Georgetown University		Walsh, Alice Frances	Va.
Wal, Central George	Md.	Walsh, Shirley Ann	D.C.
Wal, Emma Louise	Texas	B.S. 1913, Missouri State College	
A.B. 1917, Baptist, Methodist		Walsh, S. George Ann	D.C.
Walsh, Bailey Nelson	Md.	A.B. 1911, The George Washington University	
Walsh, Elizabeth Ann	Md.	Walsh, John Carl	Md.
Walsh, Ralph M. Henry	N.C.	Walsh, Clara George	N.Y.
B.S. 1901, University of Tennessee		B.S. 1901, Long State College	
Walsh, Richard Warner	Md.	Walsh, Donald Eugene	Md.
B.S. in E.E. 1911, Purdue University		B.S. 1901, University of Redlands	W.Va.
Walsh, Samuel Leonard	Fla.	Walsh, Carl George	
Walsh, Yvonne Elise	D.C.	A.B. 1911, West Virginia University	Md.
A.B. in Chem. 1911, The George Washington University		Walsh, Elizabeth Virginia	
Walsh, John Edgar, Jr.	Va.	B.S. 1911, Pennsylvania State University	
A.P. 1901, University of Maryland		Walsh, Emily Mathew	Va.
Walsh, John Robert	Md.	Walsh, Frank George	Md.
B.S. 1901, Georgetown University		A.B. 1901, Southern Illinois University	
Walsh, Mary Joseph	Md.	Walsh, James Thomas	Neb.
Walsh, David Donald	Va.	B.S. 1901, University of Nebraska	
Walsh, Robert Dean	Texas	Walsh, John Henry	Md.
Walsh, George Raymond	D.C.	Walsh, John Lawrence	N.Y.
Walsh, Arthur James	N.J.	Walsh, Joseph Lee	
A.B. 1911, The George Washington University		A.M. 1901, University of Nevada	
Walsh, Thelma	W.Va.	Walsh, Paul	
B.S. in E.E. 1901, The George Washington University		A.B. 1901, U.D. 1901, Ross-McIntire	
Walsh, Mary Pauline		Walsh, Mary Pauline	D.C.
B.S. 1901, Western Teachers College			



Wardell, Richard Norman	D.C.	Waring, Paul Anthony	Md.
B.S. 1954, Illinois Institute of Technology		Waring, Walter Lane	Va.
Ward, Ernest Albert	Kans.	Waring, Charles Rufus	Md.
A.B. 1925, Municipal University of Washington		Waring, Frank Charles Institute of Technology	
Ward, Leonard Ann	D.C.	Waring, Curtis Monroe	Md.
Ward, William F. (Jr.), Jr.	Pa.	A.B. 1927, University of Maryland	
A.B. 1927, University of Maryland		Waring, John A.	Va.
Ward, Thomas Eugene	D.C.	Waring, John Miller	Va.
Ward, Martin Lee	D.C.	A.B. 1927, Tulane University	
A.B. 1927, U.C. 1928, University of Iowa		A.M. 1927, Northwestern University	
Ward, Vernon Everett	D.C.	Waring, Joseph M.	Md.
Ward, William	Md.	Waring, John A.	Md.
Ward, James Patrick	D.C.	Waring, William T.	Pa.
A.B. 1927, University of Richmond		A.B. 1927, The George Washington University	
Ward, George Wright	D.C.	Ward, John Jerome	Pa.
B.S. 1917, Duke University		Ward, Peter Cyril	Vt.
Ward, Joseph Robert	D.C.	Ward, Richard Lewis	Ind.
Ward, Thomas F. (Jr.)	D.C.	A.B. 1927, The George Washington University	
Ward, Howard Paul	Va.	Ward, George Lawrence	D.C.
Ward, Mark Moore	Md.	Ward, George Monroe	Pa.
A.B. 1924, University of Richmond		Ward, David Leslie	Va.
Ward, Leroy J.	Md.	A.B. 1927, The George Washington University	
Ward, Frank Randall	Va.	Ward, H. K.	Conn.
Ward, Herbert Samuel	D.C.	B.S. 1927, Bates College	
Ward, Thomas Everett	Va.	Ward, Robert Carter	Va.
Ward, Vernon Alexander	D.C.	A.B. 1927, The George Washington University	
Ward, William	D.C.	Ward, William J.	Md.
B.S. 1927, M.C.F. 1927, Richmond Polytechnic Institute		Ward, William J.	Md.
Ward, William	Ind.	A.B. 1927, Middle State College	
A.B. 1927, University of Richmond		M.A. 1927, University of	
Ward, Charles J. Marshall	Va.	Ward, Frank Marshall, Jr.	D.C.
Ward, Mary Virginia	D.C.	Ward, Thomas Robert	Md.
Ward, Leonard	D.C.	Ward, Charles William	Va.
Ward, William Victor	D.C.	Ward, Howard Marion	D.C.
Ward, Margaret	Md.	A.B. 1927, Wesley College	
Ward, Robert Lee	Va.	Ward, John Henry	D.C.
Ward, Charles Edward	Va.	Ward, John Edward	Va.
A.B. 1927, University of Virginia		Ward, John Monroe, Jr.	Va.
Ward, Arthur R. (Jr.)	Vt.	A.B. 1927, The George Washington University	
Ward, Thomas H. (Jr.)	Ohio	Ward, Carlton Lavette	Oreg.
Ward, John F.	D.C.	B.S. 1927, University of	
Ward, Victor H.	D.C.	Ward, George Henry	Maine
Ward, George	D.C.	A.B. 1927, A.M. 1927, The George Washington University	
Ward, Mary R.	Md.	Ward, George Victor	Md.
Ward, William Robert	Va.	Ward, Howard	Va.
Ward, Louis Edward	Japan	Ward, John, Kenneth Eugene	Bahamas
Ward, Yvonne	D.C.	A.B. 1927, The George Washington University	
Ward, Frances Mae	D.C.	Ward, Mildred Wright	Ga.
Ward, George	D.C.	A.B. 1927, The George Washington University	
A.B. 1927, The George Washington University		Ward, Peter Fred	S.D.
Ward, Anne Lee	D.C.	A.B. 1927, University of Iowa	
Ward, Howard Joseph, Jr.	Md.	Ward, David Lawrence	Md.
Ward, John	Md.	Ward, George Calvin	Va.
B.S. 1927, U.S. Naval Academy		M.S. 1927, Massachusetts Institute of Technology	
M.S. 1927, Massachusetts Institute of Technology		Ward, Jane Victoria	Va.
Ward, John Warren	Md.	A.B. 1927, The George Washington University	
A.B. 1927, Middle State College		Ward, Mary Stoffer	Md.
Ward, Margaret Patricia	D.C.	Ward, William F.	Va.
Ward, Michael Leslie	Va.	B.S. 1927, Duke University	
Ward, Karl Randall	Va.		
Ward, Henry Lancaster	D.C.		

Wagner, William Melton	Va	Wagner, Joseph Frank	M
Wald, Charles Yarnes	Md	Wald, Joseph	M
Wald, Stanley Ross	Md	Wald, Joseph	Pa
Wald, George Louis	Low	Wald, Joseph	N.J.
Wald, David	N.Y.	Wald, Joseph	
U.S. 1862, University of Arkansas		Wald, Joseph	
Wald, David Yarnes	Ches	Wald, Joseph	M
Wald, John Horner	W.Ya.	Wald, Joseph	Pa
Wald, David Yarnes	Md	Wald, Joseph	
U.S. 1862, M.F. 1862, Northwestern University		Wald, Joseph	
Wald, John Horner	I.C.	Wald, Joseph	Md
Wald, Richard William	D.C.	Wald, Joseph	
Wald, Richard William	I.C.	Wald, Joseph	
Wald, William Thomas, Jr.	D.C.	Wald, Joseph	
U.S. 1862, Women Teachers College		Wald, Joseph	
Wald, William Y.	Pa	Wald, Joseph	
U.S. 1862, Teachers College		Wald, Joseph	
Wald, Frederick Nelson	Va	Wald, Joseph	
Wald, Charles August, Jr.	Va	Wald, Joseph	
Wald, Charles August	Md	Wald, Joseph	
Wald, Frederick Louis	I.C.	Wald, Joseph	
Wald, George Eugene	I.C.	Wald, Joseph	
Wald, John Charles	I.C.	Wald, Joseph	
U.S. 1862, U.S. 1862, Long University		Wald, Joseph	
Wald, Joseph H.	Va	Wald, Joseph	
U.S. 1862, U.S. 1862, University of Arkansas		Wald, Joseph	
Wald, David Horner	N.J.	Wald, Joseph	
U.S. 1862, U.S. 1862, University of Arkansas		Wald, Joseph	
Wald, George George	Md	Wald, Joseph	
Wald, Joseph Mary	N.J.	Wald, Joseph	
Wald, Joseph Mary	Low	Wald, Joseph	
Wald, Joseph Mary	Low	Wald, Joseph	
Wald, Joseph Mary	Va	Wald, Joseph	
U.S. 1862, U.S. 1862, University of Arkansas		Wald, Joseph	
Wald, Joseph Mary	Va	Wald, Joseph	
Wald, Joseph Mary	D.C.	Wald, Joseph	
U.S. 1862, U.S. 1862, Northwestern University		Wald, Joseph	
Wald, Joseph Mary	D.C.	Wald, Joseph	
Wald, Joseph Mary	Md	Wald, Joseph	
Wald, Joseph Mary	Va	Wald, Joseph	
Wald, Joseph Mary	D.C.	Wald, Joseph	
Wald, Joseph Mary	R.I.	Wald, Joseph	
Wald, Joseph Mary	Md	Wald, Joseph	
U.S. 1862, U.S. 1862, University of Arkansas		Wald, Joseph	
Wald, Joseph Mary	N.Y.	Wald, Joseph	
Wald, Joseph Mary	Md	Wald, Joseph	
U.S. 1862, U.S. 1862, University of Arkansas		Wald, Joseph	
Wald, Joseph Mary	D.C.	Wald, Joseph	
Wald, Joseph Mary	Md	Wald, Joseph	
Wald, Joseph Mary	Va	Wald, Joseph	
Wald, Joseph Mary	N.J.	Wald, Joseph	
U.S. 1862, U.S. 1862, University of Arkansas		Wald, Joseph	
Wald, Joseph Mary	D.C.	Wald, Joseph	
Wald, Joseph Mary	Md	Wald, Joseph	
Wald, Joseph Mary	Va	Wald, Joseph	
Wald, Joseph Mary	N.J.	Wald, Joseph	
U.S. 1862, U.S. 1862, University of Arkansas		Wald, Joseph	
Wald, Joseph Mary	D.C.	Wald, Joseph	
Wald, Joseph Mary	Md	Wald, Joseph	
Wald, Joseph Mary	Va	Wald, Joseph	
Wald, Joseph Mary	N.J.	Wald, Joseph	
U.S. 1862, U.S. 1862, University of Arkansas		Wald, Joseph	
Wald, Joseph Mary	D.C.	Wald, Joseph	
Wald, Joseph Mary	Md	Wald, Joseph	
Wald, Joseph Mary	Va	Wald, Joseph	
Wald, Joseph Mary	N.J.	Wald, Joseph	
U.S. 1862, U.S. 1862, University of Arkansas		Wald, Joseph	
Wald, Joseph Mary	D.C.	Wald, Joseph	
Wald, Joseph Mary	Md	Wald, Joseph	
Wald, Joseph Mary	Va	Wald, Joseph	
Wald, Joseph Mary	N.J.	Wald, Joseph	
U.S. 1862, U.S. 1862, University of Arkansas		Wald, Joseph	
Wald, Joseph Mary	D.C.	Wald, Joseph	
Wald, Joseph Mary	Md	Wald, Joseph	
Wald, Joseph Mary	Va	Wald, Joseph	
Wald, Joseph Mary	N.J.	Wald, Joseph	
U.S. 1862, U.S. 1862, University of Arkansas		Wald, Joseph	
Wald, Joseph Mary	D.C.	Wald, Joseph	
Wald, Joseph Mary	Md	Wald, Joseph	
Wald, Joseph Mary	Va	Wald, Joseph	
Wald, Joseph Mary	N.J.	Wald, Joseph	
U.S. 1862, U.S. 1862, University of Arkansas		Wald, Joseph	
Wald, Joseph Mary	D.C.	Wald, Joseph	
Wald, Joseph Mary	Md	Wald, Joseph	
Wald, Joseph Mary	Va	Wald, Joseph	
Wald, Joseph Mary	N.J.	Wald, Joseph	
U.S. 1862, U.S. 1862, University of Arkansas		Wald, Joseph	
Wald, Joseph Mary	D.C.	Wald, Joseph	
Wald, Joseph Mary	Md	Wald, Joseph	
Wald, Joseph Mary	Va	Wald, Joseph	
Wald, Joseph Mary	N.J.	Wald, Joseph	
U.S. 1862, U.S. 1862, University of Arkansas		Wald, Joseph	
Wald, Joseph Mary	D.C.	Wald, Joseph	
Wald, Joseph Mary	Md	Wald, Joseph	
Wald, Joseph Mary	Va	Wald, Joseph	
Wald, Joseph Mary			

Wells, Paula Lee	D.C.	Wentzel, Raymond	Md.
A.B. 1944, Rutgers University		B.S. 1944, University of Minnesota	
Wells, Theodore	D.C.	Wentzel, Milton M.H.	D.C.
Wells, Wallace Hartman	I.C.	B.S. 1941, A.M. 1944, Columbia University	
Wells, Herbert	Md.	Wentzel, Roy Lee	D.C.
B.S. 1945, College of the City of New York		Wentzel, William Frank	Wisc.
M.A. 1947, The George Washington University		B.S. 1941, U.S. Naval Academy	
Wells, Paul	N.Y.	B.S. 1941, M.A. 1944, Boston University	
B.S. 1947, Rutgers University		Wentzel, William	Ya.
Wells, Joseph	D.C.	Wentzel, Leonard Murray	D.C.
Wells, Robert Thomas	N.Y.	Wentzel, Mary S.	Cal.
Wells, Fred Whitfield	Ya.	Wentzel, James Louis	N.Y.
Wells, George Kenneth	D.C.	Wentzel, Ira Lee	
Wentzel, Mary Louise	D.C.	A.B. 1941, U.S. Maritime University	
A.B. 1942, The George Washington University		Wentzel, William	Ya.
Wells, Richard	D.C.	Wentzel, Victor Eugene	D.C.
Wells, George Key	D.C.	Wentzel, Robert Ernest	Wisc.
A.B. 1941, University of California		Wentzel, Charles Henry	
A.M. 1944, University of California		B.S. 1941, M.D. 1944, University of Minnesota	
Wells, Carl Henry	D.C.	Wentzel, James	Md.
Wells, Robert Henry	D.C.	Wentzel, Donald William	D.C.
Wells, Robert Louis	D.C.	Wentzel, James Paul	Md.
Wentzel, Robert James	Ya.	Wentzel, Paul Kenneth	Md.
B.S. 1947, Albany College		B.S. 1941, Morris University	
Wentzel, John	Cal.	Wentzel, George John	Ya.
Wentzel, George Herbert	Cal.	Wentzel, William	D.C.
B.S. 1941, U.S. Coast Guard Academy		Wentzel, Robert Warren	Texas
Wentzel, Lee M.	D.C.	Wentzel, Donald David	D.C.
A.B. 1941, Wesleyan University		Wentzel, James Kenneth	Ya.
Wentzel, Joseph Albert	Ya.	A.B. 1941, Yale University	
B.S. 1941, U.S. Coast Guard Academy		M.D. 1941, Harvard University	
Wentzel, Theodore Louise	D.C.	Wentzel, John	D.C.
Wentzel, Dallas Lee	Ya.	Wentzel, Richard Eugene	
Wentzel, John Charles Jr.	Ya.	B.S. 1944, Boston Teachers College	
Wentzel, Minnie Wilcox	Md.	M.S. 1947, University of Wisconsin	
B.S. 1941, Miami University		Wentzel, William	Ya.
Wentzel, John	D.C.	A.B. 1941, The George Washington University	
Wentzel, Robert Dean Jr.	D.C.	Wentzel, Neil V.	N.D.
A.B. 1941, The George Washington University		B.S. 1941, Maryland State Teachers College	
Wentzel, Ruth Helen	Cal.	Wentzel, Frank A. Edward	Ya.
B.S. 1941, University of Illinois		A.B. 1941, Columbia University	
Wentzel, William Edward	W.Ya.	M.D. 1941, New York University	
Wentzel, Edward Thomas	Md.	Wentzel, Gerald M.	N.Y.
A.B. 1941, Duke University		Wentzel, Kent Helen	D.C.
B.S. 1941, University of Maryland		Wentzel, John	Md.
Wentzel, John Albert	D.C.	A.B. 1941, New York University	
Wentzel, Paul Spencer	W.Ya.	A.M. 1941, The George Washington University	
A.B. 1947, Stanford College		Wentzel, James William	Ya.
A.M. 1941, The George Washington University		B.S. 1941, U.S. Navy University of Wisconsin	
Wentzel, Stanley Paul	Cal.	Wentzel, Arthur Paul	Texas
B.S. 1941, University of Illinois		Wentzel, Arthur Richard	Ya.
Wentzel, George William	D.C.	B.S. 1941, Northwestern University	
Wentzel, James M.	D.C.	Wentzel, Michael James	Cal.
Wentzel, William Robert	Ya.	B.S. 1941, U.S. Navy U.S. Navy	
B.S. 1941, U.S. Navy U.S. Navy		University of Washington	
Wentzel, John	Ya.	Wentzel, John J.	D.C.
Wentzel, John	Ya.	Wentzel, John Thomas	Ya.
Wentzel, Robert	D.C.	A.B. 1941, U.S. Navy University of Illinois	
Wentzel, John Anthony	W.Ya.	Wentzel, John Thomas	D.C.
A.B. 1941, St. John's University		Wentzel, Robert Louis	D.C.
Wentzel, Anne	D.C.	Wentzel, Charles Victor	Ya.
Wentzel, Robert Raymond	Ya.	B.S. 1941, M.B. 1941, Case Institute of Technology	
Wentzel, Robert R. Louis Jr.	Md.	Wentzel, Jerry Lee	D.C.
Wentzel, Murray	D.C.	Wentzel, John Louis	Ya.
A.B. 1941, University of Maryland			
Wentzel, Robert Murray Jr.	D.C.		



Wheeler, Robert Allen		Wiley, Robert DeWayne	D.C.
A.B. 1919, Yale University		A.B. 1919, Michigan State University	
Wheeler, Wesley Russell	N.H.	Wiley, Robert DeWayne	Va.
Wheeler, Willie Ruth	Va.	A.B. 1919, St. Mary's College	
Wheeler, Carl Ross	D.C.	A.M. 1921, Pontifical School of Law	
Wheeler, Herbert Dante	Ta.	and Teachers	
Wheeler, Walter Hume, Jr.	Va.	Wiley, Robert DeWayne	Mass.
Wheeler, Carl Stephen	Ak.	B.S. 1921, Northwestern University	
B.S. 1921, A.M. 1921,		Wiley, Robert M. Kay	Va.
University of Arkansas		B.S. 1921, Albion College	
Wheeler, Henry Lee	Va.	Wiley, Robert DeWayne	Va.
Wheeler, John C. Jr.	D.C.	Wiley, Robert DeWayne	D.C.
B.S. 1921, Wheaton College		A.B. 1921, Harvard University	
Wheeler, George	D.C.	Wiley, Robert	Ill.
Wheeler, Mary Dianne	Va.	A.B. 1921, The George Washington	
Wheeler, Allen Frederick	Md.	University	
Wheeler, Allen Phineas, Jr.	Ak.	A.M. 1921, Teachers School of Law	
B.S. 1921, University of		and Teachers	
Arkansas		Wiley, Robert DeWayne	D.C.
Wheeler, Arthur Thomas	Vt.	A.B. 1921, University of Washington	
B.S. 1921, U. S. Naval Academy		Wiley, Robert DeWayne	Mass.
B.S. 1921, Miami University		A.B. 1921, University of Washington	
of Ohio		Wiley, Robert DeWayne	D.C.
Wheeler, Barbara	D.C.	A.B. 1921, University of Washington	
B.M. 1921, St. Lawrence University		Wiley, Robert DeWayne	D.C.
Wheeler, Margaret Lee	Ak.	A.M. 1921, University of Washington	
B.S. 1921, Texas Technological		Wiley, Robert DeWayne	D.C.
Institute		Wiley, Robert DeWayne	D.C.
Wheeler, Bruce A.	Conn.	Wiley, Robert DeWayne	D.C.
Wheeler, Clara Lane	Va.	Wiley, Robert DeWayne	D.C.
Wheeler, George Leavitt	Vt.	Wiley, Robert DeWayne	D.C.
A.B. 1921, Mary Washington College		Wiley, Robert DeWayne	D.C.
Wheeler, Donald Marvin	Md.	Wiley, Robert DeWayne	D.C.
Wheeler, Donald Nelson	D.C.	Wiley, Robert DeWayne	D.C.
Wheeler, Donald Orr	Conn.	Wiley, Robert DeWayne	D.C.
A.B. 1921, University of Washington		Wiley, Robert DeWayne	D.C.
Wheeler, Edgar Thompson	D.C.	Wiley, Robert DeWayne	D.C.
B.S. 1921, Wheaton College		Wiley, Robert DeWayne	D.C.
A.M. 1921, New York University		Wiley, Robert DeWayne	D.C.
Wheeler, Ernest Lewis	Md.	Wiley, Robert DeWayne	D.C.
Wheeler, George Richard	D.C.	Wiley, Robert DeWayne	D.C.
A.B. 1921, The George Washington		Wiley, Robert DeWayne	D.C.
University		Wiley, Robert DeWayne	D.C.
Wheeler, James E. Jr.	Va.	Wiley, Robert DeWayne	D.C.
B.S. 1921, Virginia Military Institute		Wiley, Robert DeWayne	D.C.
Wheeler, James William	Ill.	Wiley, Robert DeWayne	D.C.
A.B. 1921, Vanderbilt University		Wiley, Robert DeWayne	D.C.
A.M. 1921, Columbia University		Wiley, Robert DeWayne	D.C.
Wheeler, Jerome Duane	Ill.	Wiley, Robert DeWayne	D.C.
A.B. 1921, University of Colorado		Wiley, Robert DeWayne	D.C.
Wheeler, John Francis	Ill.	Wiley, Robert DeWayne	D.C.
B.S. 1921, Boston University		Wiley, Robert DeWayne	D.C.
Wheeler, John Leslie	Vt.	Wiley, Robert DeWayne	D.C.
A.B. 1921, M.S. 1921, Kansas		Wiley, Robert DeWayne	D.C.
College		Wiley, Robert DeWayne	D.C.
Wheeler, Joseph Hill III	Vt.	Wiley, Robert DeWayne	D.C.
A.B. 1921, American University		Wiley, Robert DeWayne	D.C.
(J. R. 1921), The George Washington		Wiley, Robert DeWayne	D.C.
University		Wiley, Robert DeWayne	D.C.
Wheeler, Leonard Allen	Md.	Wiley, Robert DeWayne	D.C.
Wheeler, Lillian H.	D.C.	Wiley, Robert DeWayne	D.C.
B.L. 1921, St. Paul's Institute		Wiley, Robert DeWayne	D.C.
Wheeler, Lillian Sykes	D.C.	Wiley, Robert DeWayne	D.C.
B.L. 1921, North Carolina State		Wiley, Robert DeWayne	D.C.
Teachers College, Elizabeth City		Wiley, Robert DeWayne	D.C.
Wheeler, Margaret Ruth	D.C.	Wiley, Robert DeWayne	D.C.
Wheeler, Philip Jr.	D.C.	Wiley, Robert DeWayne	D.C.
Wheeler, O. Edgar	D.C.	Wiley, Robert DeWayne	D.C.
B.L. 1921, Allen University		Wiley, Robert DeWayne	D.C.
Wheeler, Richard Andrew	D.C.	Wiley, Robert DeWayne	D.C.
A.B. 1921, Clark University		Wiley, Robert DeWayne	D.C.
Wheeler, Richard William	Va.	Wiley, Robert DeWayne	D.C.
A.B. 1921, Brown University		Wiley, Robert DeWayne	D.C.

Werner, David Wallis	D.C.	Wheeler, Peter Frederick	Md
A.B. 1934, University of Illinois		A.B. 1931, The George Washington University	
Werner, George Clarence	D.C.	Wheeler, James Paul Esq.	D.C.
Werner, Patricia Holmes	D.C.	Wheeler, Wayne Frederick	Md
Werner, John Mackinn, Jr.	Pa	Wheeler, William Joseph	Maine
Werner, John	I.C.	Wheeler, John Allen	Md
Werner, Thomas	Va	B.S. 1935, A.M. 1937, University of Missouri	
A.B. 1933, The George Washington University		Wheeler, Edwin Howard, Jr.	Md
B.A.M. 1933, University of Illinois		A.B. 1934, Emerson College	
Werner, Benjamin	D.C.	Wheeler, Helen Ruth	N.H.
A.B. 1933, The George Washington University		A.B. 1933, Syracuse University	
Werner, Franklin Rafael	D.C.	Wheeler, John William	Va
Werner, Charles Joseph	D.C.	Wheeler, Milton Lawrence	Iowa
Thesis: From 1890, Charles University of Connecticut		Wheeler, Albert William	Md
Werner, Thomas Franklin	Md	A.B. 1933, Long Mary College	
Wheeler, Albert Randolph	Va	Wheeler, William	Va
Werner, John Ray	Va	B.S. 1933, Virginia State College	
B.A. 1933, College of William and Mary		Wheeler, John Brown	N.C.
Wheeler, Donald James	Md	Wheeler, John Mackinn	D.C.
B.S. 1933, U.S. Naval Academy		Wheeler, James Sargent	Md
Wheeler, Mary Robinson	D.C.	Wheeler, Frederick A.	D.C.
A.B. 1933, South Carolina State College		Wheeler, Henry Charles	Va
Wheeler, Timothy Mae	Md	Wheeler, John Esq.	Va
Wheeler, John Lawrence	Va	Wheeler, Thomas William	Md
A.B. 1933, Wake College		Wheeler, Thomas Marie	Iowa
Wheeler, Robert Hume	Md	Wheeler, Howard Frederick	Md
B.S. 1933, I.F.F. 1935, University of California		A.B. 1933, Eastern College	
Wheeler, Robert Lynn, Jr.	Md	Wheeler, Howard Emerson	N.Y.
Wheeler, Peter Van Dyke	Va	Wheeler, Jack Hume	Pa
B.S. 1933, Lehigh University		A.B. 1933, Pennsylvania State University	
Wheeler, Mary Frederick	W.Va	Wheeler, Lucile Sarah	D.C.
B.S. 1933, University of Maryland		B.S. 1933, D.C. Teachers College	
Wheeler, John Frank	Pa	Wheeler, John Gustav	Va
Wheeler, David Elton	Md	B.S. 1933, and I.F.F. 1935, California Agricultural and Mechanical College	
Wheeler, Robert April	Md	Wheeler, James Otto	D.C.
B.S. 1933, The George Washington University		Wheeler, James William, Jr.	Va
Wheeler, James Elton	Va	B.S. 1933, Virginia Military Institute	
Wheeler, Louis Marie	Md	Wheeler, Lee William	Ia
Wheeler, Billy Elton	Texas	A.B. 1933, The George Washington University	
Wheeler, Arthur E.	Pa	Wheeler, James Elton	Md
B.S. 1933, Texas Institute		Wheeler, John Marie	D.C.
Wheeler, John Elton	W.Va	Wheeler, John Elton, Jr.	Nev.
Wheeler, John Elton	I.C.	B.S. 1933, U.S. Naval Academy	
Wheeler, John Elton	Va	Wheeler, John Elton, Jr.	Va
A.B. 1933, College of William and Mary		Wheeler, John Elton, Jr.	Va
A.M. 1933, Duke University		B.S. 1933, Western Kentucky College	
Wheeler, Mary Ella	D.C.	Wheeler, John Elton, Jr.	Md
Wheeler, Robert Albert	Md	Wheeler, Kathryn Nelson	D.C.
Wheeler, William Joseph	Va	B.S. 1933, University of Kansas	I.C.
B.S. 1933, University of Iowa		Wheeler, Luther William	N.C.
Wheeler, William Joseph	Md	Wheeler, Melvin Elton	Va
B.S. 1933, American University		A.B. 1933, Randolph-Macon Woman's College	
Wheeler, John Elton	Va	M.S. 1933, University of Southern California	
Wheeler, John Elton	D.C.	Wheeler, Mary Elton	Md
A.B. 1933, The George Washington University		Wheeler, Mary Elton	D.C.
Wheeler, Mary Margaret	D.C.	Wheeler, Mary Elton	Pa
A.B. 1933, The George Washington University		Wheeler, Phyllis Elton	Va
Wheeler, John Elton	Md	B.S. 1933, Thomas University	Va
B.S. 1933, Mary Washington College		Wheeler, Evelyn Kelly	Md
Wheeler, Robert Elton	Kans.	Wheeler, Richard W.	Va
A.B. 1933, Missouri University of Science		B.S. 1933, Marshall College	
Wheeler, Robert Elton		Wheeler, Robert Elton	Va

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[illegible]

Woodson, John Stanton	D.C.	Wright, Rex Adelbert	Va.
Woodson, Joseph Bernard	D.C.	Wright, R. Lee Ishbel	N.A.
B.S. 1924, South Western College		Wright, Thomas George	Va.
Woodson, William Whitaker	Va.	Wright, Timothy Shelby	Mo.
B.S. 1948, Clemson Agricultural College		Wright, William Joseph	Mo.
Woodward, Charles Carroll MacArthur	Md.	Wright, Robert Chester	D.C.
B.S. 1911, Virginia Military Institute		A.B. 1911, Washington College	
Woodward, Donald Robert	Va.	W. 1896, Univ. W.	D.C.
Woodward, Lewis K., Jr.	Va.	Wright, William Russell	Cal.
A.B. 1927, Western Maryland College		Wright, James Thomas	Va.
M.J. 1929, University of Maryland		Wright, Frank Elwood	Va.
Woodward, Paul Eugene	Pa.	B.S. in H.E. 1929, The George Washington University	
Woodward, Ronald Louis	Md.	Washington University	
Woolf, Robert Matthew	Md.	Washington, Naomi Kay	N.Y.
Woolf, Ronald Harmon, Jr.	Va.	B.S. 1924, College of St. Elizabeth	
A.P. 1934, The George Washington University		Wolberg, Henry Douglas	Va.
Worsham, Fred Lee, Charles	Mass.	A.B. 1923, Johns Hopkins	
Worsham, Ronald Edward	Mass.	M.S. 1925, University of Minnesota	
Woolf, Bertie Hamel, Ronald	D.C.	Worsham, Walter	D.C.
A.B. 1922, The George Washington University		B.S. 1911, College of the City of New York	
Worley, Dale Eddy	Mass.	A.M. 1929, New York University	
Worley, Stephen Elizabeth	D.C.	W.D. 1928, Charles University of Prague	
Worley, James	Va.	A.M. 1928, State Conservatory of Music, Copenhagen	
A.B. 1921, Virginia Military Institute		Worsham, Zerkia Vera	D.C.
Worsham, Margaret Mary	D.C.	Worsham, Emma Dwyer	Va.
Worsham, Charles Leonard	Md.	Wright, K. Otis, Jr. Harsh	Ind.
A.B. 1927, Columbia University		Wright, Thomas Foster, A.	Ind.
Worsham, New Edmund	W.Va.	Worsham, John William	Mo.
Worsham, Mary H.	Va.	A.B. 1908, 1913, The George Washington University	
Worsham, James Francis	D.C.	Worsham, Alvin Edward	Mass.
B.S. 1910, The George Washington University		Worsham, Lawrence Edward	Va.
Worrell, John William	Pa.	Worsham, Charles Joseph	D.C.
A.B. 1921, University of Pennsylvania		A.B. 1920, Ohio State University	
Worsham, Nancy Davidson	Va.	Wright, Lucy Aradon	D.C.
A.B. 1921, University of Tennessee		A.B. 1921, Emerson College	
Worsham, David Phoebe	D.C.	Worsham, Hans Gailen	Va.
B.S. in M.E. 1921, Purdue University		A.B. 1921, Gloucester College	
Worsham, Raymond Leary	Md.	Wright, William Smith	Va.
B.S. 1921, University of Maryland		A.B. 1914, Stanford State College	
Worsham, Timothy Charles	Calif.	Worsham, Felix Bernard	R.I.
Worsham, John Goodwin	Md.		
B.S. 1921, Yale University			
Worsham, Robert Lee	Va.		
Worsham, Samuel Cunningham	Md.		
Worsham, Albert George	Md.		
Worsham, Edith Vera	Va.		
A.B. 1917, Dickinson State Teachers College			
Worsham, John, Christian	W.Va.		
A.B. 1914, Howard College			
Worsham, George Stuart, Jr.	Md.		
Worsham, Mary Francis	D.C.		
Worsham, William Richard	Va.		
A.B. 1911, Hays Point College			
Worsham, Joseph Wayne	D.C.		
Worsham, Dorothy Lee	W.Va.		
Worsham, Florence	Va.		
B.S. 1927, M.S. 1929, University of Washington			
Worsham, David Thomas	Kent.		
A.B. 1914, University of Wichita			
Worsham, David, Jr.	Md.		
Worsham, David Carolyn	D.C.		
Worsham, Jerome Thomas	Va.		
A.B. 1920, The George Washington University			
Worsham, James May	Va.		
Worsham, John Thomas, Jr.	Md.		
Worsham, Jack Charlotte	D.C.		
Worsham, Peter	Va.		
		Yarrow, Harold	Md.
		Yarrow, Michael	D.C.
		B.S. 1942, Greek Military Academy	
		B.S. 1915, Athens Technical Institute	
		M.S. in Eng. 1920, The George Washington University	
		Yarrow, Paul A. David	Va.
		Yarrow, Andrew Joseph	D.C.
		Yarrow, James Thomas	Ind.
		Yarrow, Kathleen Mayron	Va.
		Yarrow, Joseph William	Calif.
		Yarrow, David Chang	Thailand
		Yarrow, John G. Lee	N.Y.
		Yarrow, William Conrad	D.C.
		Yarrow, Thomas Gailen	
		B.S. 1925, North Carolina State Teachers College, Fayetteville	
		Yarrow, Richard Robert	Md.
		Yarrow, Edith James	Ind.
		Yarrow, William Mason	Va.
		Yarrow, Pauline Stuart	D.C.
		Yarrow, Harvey Ansell	D.C.
		Yarrow, Nellie Lewis	





Yusick, Michael Ryan	N.Y.	Zurbrugg, Nicholas	Md.
Yusuf, Paul Ibrahim	D.C.	Zurbrugg, David William	D.C.
A.B. 1919, Cornell College		A.B. 1919, Dickinson College	
Yusuf, Captain Ghouse	Calif.	Zurbrugg, Joseph	D.C.
Yusuf, John James	Md.	Zurbrugg, Frank Anthony	Va.
A.B. 1911, The George Washington University		B.S. 1915, U.S. Naval Academy	
Yusuf, Joseph Peter	Va.	Zurbrugg, Andrew Louis	N.M.
B.S. 1911, University of Pittsburgh		A.B. 1911, Harvard University	
Yusuf, Joseph Peter	Ill.	Zurbrugg, Joseph	Md.
B.S. 1911, Rose The Naval Academy		A.B. 1911, Washington University	
B.S. in M.E. 1918, German Institute of Technology		Zurbrugg, Thomas Patrick	Md.
Yusuf, Carl Victor	Pa.	B.S. in Eng. 1918, The George Washington University	
Z			
Zachary, Valentine	N.Y.	Zurbrugg, David Joseph	D.C.
Zachary, Howard Franklin	Md.	Zurbrugg, Louis Morris	Calif.
Zachary, John Edward	Va.	A.B. 1911, M.S. 1911, University of California	
A.B. 1911, McIntosh College		Zurbrugg, John Henry	Kent.
Zachary, Herman Louis	Md.	B.S. 1911, U.S. Naval Academy	
Zach, Mallory Hall	Va.	Zurbrugg, John	D.C.
B.S. 1911, Mary Washington College		B.S. in M.E. 1911, Pennsylvania State University	
Zach, Robert Louis	Md.	Zurbrugg, William Edward	N.Y.
B.S. 1911, Maryland Agricultural College		Zurbrugg, George A. Henry	D.C.
Zach, Carl Eugene	Pa.	Zurbrugg, Alexander A.	D.C.
Zacharias, Arthur Vaughan	Va.	Zurbrugg, John	D.C.
A.B. 1911, Brown University		LL.B. 1911, The George Washington University	
Zachary, Joseph John	Va.	Zurbrugg, Mary M.	N.H.
Zachary, Victor Gould	N.Y.	A.B. 1911, Ohio Hall College	
B.S. 1911, College of the City of New York		Zurbrugg, Robert Thomas	Md.
M.S. 1911, The George Washington University		A.B. 1911, A.M. 1911, The George Washington University	
Zachary, Edward H.	D.C.	Zurbrugg, Mary M.	Md.
Zach, Linda Ann	D.C.	B.S. 1911, U.S. Naval Academy	
Zachary, Harry Walter Eugene	D.C.	M.S. 1911, Massachusetts Institute of Technology	
Zach, Joseph Francis C. J.	Md.	Zurbrugg, John Carl	Md.
B.M.E. 1911, Catholic University of America		Zurbrugg, Arthur Martin	Md.
Zach, John	D.C.	Zurbrugg, William Louis	D.C.
Zach, John	D.C.	B.S. 1911, Georgetown University	N.Y.
Zach, John	Va.	Zurbrugg, Paul J.	N.Y.
B.S. 1911, West Virginia University		A.B. 1911, University of Buffalo	
Zach, Edward J.	D.C.	Zurbrugg, Charles Thomas	N.J.
A.B. 1911, Temple University		Zurbrugg, Robert Charles	Pa.
U.S. 1911, Georgetown University		B.S. 1911, Temple University, Pa.	
Zach, John	D.C.	Zurbrugg, William	Md.
Zachary, James W.	D.C.	B.S. 1911, Georgetown College	
A.B. 1911, University of Virginia		Zurbrugg, Frank James	Va.
Zach, Mary Ann	Ohio	B.S. 1911, University of Kentucky	
Zachary, Mary Elizabeth	Md.	Zurbrugg, John	
Zach, William	Va.	B.S. 1911, Virginia College	
Zach, James Paul	Va.	A.M. 1911, The George Washington University	
B.S. A. 1911, University of Chicago		Zurbrugg, John Kenneth	D.C.
Zachary, Keith Lee	N.H.	Zurbrugg, John	D.C.
B.S. 1911, University of Chicago		Zurbrugg, William	D.C.
H.B. 1911, University of North Dakota		Zurbrugg, William	Md.
Zachary, John Henry	D.C.	Zurbrugg, Andrew William	D.C.
Zachary, John Henry	Md.	Zurbrugg, Joseph John	D.C.
Zach, Michael Alfred	Ill.	Zurbrugg, Henry F.	
A.B. 1911, Pacific University		Zurbrugg, John	N.Y.
Zach, Mary Elizabeth	D.C.	A.B. 1911, Union College	
Zach, William David	Md.	Zurbrugg, William	N.Y.
Zach, Paul and Charles	Wis.	B.S. 1911, M.E. 1911, New York State College of Forestry, Arnold	
B.S. 1911, The George Washington University		Zurbrugg, John	Va.
Zach, Robert Eugene	Md.	A.B. 1911, U.S. Naval Academy	
B.S. 1911, U.S. Naval Academy		Zurbrugg, John	Va.
Zach, William		Zurbrugg, John	Md.
		Zurbrugg, John	

# SUMMARY OF REGISTRATION

1950-57

## JUNIOR COLLEGE

	Males	Women	Total
Freshmen	414	497	911
Sophomores	509	452	961
Total	1,182	949	2,131

## COLUMBIAN COLLEGE

Freshmen	157	157	314
Sophomores	217	203	420
Candidates for the degree of Master of Arts	608	120	728
Candidates for the degree of Master of Science	104	15	119
Unaffiliated	34	8	42
Total	1,130	512	1,642

## THE GRADUATE COUNCIL

Candidates for the degree of Doctor of Philosophy	104	24	128
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## THE SCHOOL OF MEDICINE

First Year	61	8	69
Second Year	61	2	63
Third Year	61	4	65
Fourth Year	61	8	69
Total	244	22	266

## THE LAW SCHOOL

First Year	108	40	148
Second Year	100	30	130
Third Year	118	17	135
Candidates for the degree of Master of Laws	30	1	31
Candidates for the degree of Master of Commerce	18	1	19
Candidates for the degree of Master of Civil Law (Am. Pl.)	1	—	1
Candidates for the degree of Doctor of Juris Doctor	8	—	8
Unaffiliated	12	1	13
Total	485	79	564

## THE SCHOOL OF ENGINEERING

	Men	Women	Total
Freshmen .....	287	4	291
Sophomores .....	203	1	204
Juniors .....	191	1	192
Seniors .....	151	—	151
Candidates for the degree of Master of Science ..	112	—	112
Candidates for the degree of Master of Engineering Adv. ..	375	—	375
Unclassified .....	20	—	20
Total .....	1,315	6	1,321

## THE SCHOOL OF PHARMACY

Juniors .....	21	—	21
Seniors .....	21	1	22
Graduate .....	1	—	1
Total .....	43	1	44

## THE SCHOOL OF EDUCATION

Juniors .....	13	45	58
Seniors .....	37	1-2	139
Candidates for the degree of Master of Arts ..	100	213	313
Candidates for the degree of Master of Science ..	5	1	6
Candidates for the degree of Doctor of Philosophy ..	35	10	45
Candidates for Advanced Professional Certificate ..	11	12	23
Unclassified .....	51	95	146
Total .....	338	486	824

## THE SCHOOL OF GOVERNMENT

Juniors .....	90	41	137
Seniors .....	204	42	246
Candidates for the degree of Master of Arts ..	198	37	235
Candidates for the degree of Master of Business Adv. ..	145	4	149
Candidates for the degree of Master of Public Adv. ..	12	1	13
Candidates for the degree of Master of Personnel Adv. ..	11	3	14
Candidates for the degree of Doctor of Business Adv. ..	14	—	14
Unclassified .....	27	1	28
Total .....	674	118	792



## THE COLLEGE OF GENERAL STUDIES

	Men	Women	Total
Candidates for the degree of Associate in Arts	48	2	50
Candidates for the degree of Bachelor of Arts	57	1	58
Candidates for the degree of Bachelor of Science	4	—	4
Candidates for Master of Arts	18	3	21
Candidates for degree of Master of Arts in Professional Management	1	—	1
Total	94	6	100

## THE DIVISION OF UNIVERSITY STUDENTS

University Students	2,334	1,387	3,721
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## THE DIVISION OF SPECIAL STUDENTS

Special Students	73	144	217
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## SUMMARY

Students Registered Academic Year 1956-57	11,476	5,410	16,886
Students Registered Summer Session 1956-57	4,404	1,111	5,515
Total Registered 1956-57	15,880	6,521	22,401
Students Registered	8,894	2,007	10,901
Total Number of Students Registered 1956-57*	8,894	4,014	12,908

\* The above does not include

The College of General Studies (Off Campus)

Civil Control	4,018
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Noncredit Courses	497
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Total	5,395
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## TEACHING STAFF 1956-57

Professor Emeritus	20
Professor	102
Associate Professor	1
Assistant Professor	4
Professorial Lecturer	100
Clinical Professor	10
Assistant Clinical Professor	6
Associate Professor	57
Assistant Clinical Professor	15
Assistant Professional Lecturer	4
Lecturer in the School of Medicine	119
Assistant Professor	6
Assistant Clinical Professor	55
Assistant Research Professor	7
Lecturer	10
Instructor	41

Clinical Instructors .....	167
Assistants .....	69
Fellows .....	28
Graduate Teaching Assistants .....	15
Technicians .....	14
<b>TOTAL .....</b>	<b>1,011</b>

## DEGREES CONFERRED

Associate in Arts (College of General Studies) .....	27
Associate in Arts (Junior College) .....	534
Bachelor of Arts .....	237
Bachelor of Arts (College of General Studies) .....	19
Bachelor of Arts in Education .....	71
Bachelor of Arts in Government .....	123
Bachelor of Civil Engineering .....	12
Bachelor of Electrical Engineering .....	26
Bachelor of Laws .....	165
Bachelor of Laws (National University) .....	4
Bachelor of Mechanical Engineering .....	19
Bachelor of Science .....	35
Bachelor of Science in Engineering .....	11
Bachelor of Science in Home Economics .....	7
Bachelor of Science in Pharmacy .....	25
Bachelor of Science in Physical Education .....	20
Doctor of Education .....	4
Doctor of Medical Science .....	4
Doctor of Medicine .....	88
Doctor of Philosophy .....	27
Joint Doctor .....	36
Master of Arts .....	47
Master of Arts (College of General Studies) .....	31
Master of Arts in Education .....	96
Master of Arts in Government .....	44
Master of Arts in Personnel Administration .....	11
Master of Arts in Public Administration .....	6
Master of Business Administration .....	73
Master of Commerce Law .....	6
Master of Comparative Law (American Period) .....	6
Master of Engineering Administration .....	18
Master of Laws .....	25
Master of Science .....	21
Master of Science in Engineering .....	3
	<b>1,881</b>

## GEOGRAPHICAL DISTRIBUTION OF STUDENTS

## UNITED STATES, TERRITORIES, AND POSSESSIONS

Alabama .....	74	Canada .....	29
Arizona .....	9	Guatemala .....	80
Arkansas .....	12	Honduras .....	20
California .....	173	Idaho .....	244

Florida	117	North Carolina	150
Georgia	33	North Dakota	31
Idaho	23	Oregon	143
Illinois	123	Oklahoma	40
Indiana	75	Oregon	10
Iowa	48	Pennsylvania	457
Kansas	41	Rhode Island	20
Kentucky	28	South Carolina	15
Louisiana	24	South Dakota	21
Maine	33	Tennessee	41
Maryland	227	Texas	90
Massachusetts	154	Utah	41
Michigan	153	Vermont	15
Minnesota	62	Virginia	52
Mississippi	25	Washington	40
Missouri	60	West Virginia	98
Montana	10	Wisconsin	42
Nebraska	20	Wyoming	12
Nevada	18	Alaska	2
New Hampshire	28	Canal Zone	1
New Jersey	124	Hawaii	24
New Mexico	10	Puerto Rico	10
New York	424		

## FOREIGN COUNTRIES

Argentina	1	Iran	11
Australia	1	Israel	3
Bahamas	1	Japan	7
Belgium	1	Lebanon	3
Bolivia	1	Libya	8
Brazil	6	Malawi	15
Brazil West Indies	1	Malaysia	3
Canada	6	Marshall	2
Chile	2	Mexico	1
China	5	Nicaragua	2
Colombia	5	Norway	1
Cuba	1	Paraguay	1
Czechoslovakia	1	Peru	1
Denmark	1	Poland	8
France	1	Portugal	7
Germany	1	Spain	1
Ghana	1	Sweden	1
Guatemala	1	Switzerland	1
Haiti	1	Taiwan	1
Hong Kong	1	Thailand	1
India	1	Turkey	1
Indonesia	1	United Kingdom	1
Iran	1	United States	1
Italy	1	Yugoslavia	1
Japan	1		



## ALUMNI AND AFFILIATED ASSOCIATIONS

### THE GENERAL ALUMNI ASSOCIATION

The objects of this Association are to unite the graduates in closer sympathy and to promote the general welfare of the University. The following persons are eligible for *active* membership: graduates of any college, school, or division of the University; holders of honorary degrees from the University; and members of the Board of Trustees and of the Faculty of the University. Any person who has matriculated, who has been in regular attendance for one year, and who has left the University in good standing, is eligible for *associate* membership.

The Office of Alumni Relations is situated at 708 22d Street, Washington 6, D. C. Alumni are urged to keep the office informed of changes of address or occupation and to supply information with regard to their fellow alumni.

1957-58

### GOVERNING BOARD

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*School of Medicine.*—Richard Henry Fischer, B.S. 1939, M.D. 1943; 1801 I Street NW., Washington, D. C.

*Law School.*—Charles Oscar Brery, LL.B. 1932, A.B. 1933; 4324 43d Street NW., Washington, D. C.

*School of Engineering.*—Reuben Francis Leatherwood, B.S. in C.E. 1933, 108 Gratton Street, Chevy Chase, Md.

*School of Pharmacy.*—E. Rogge Franzoni, B.S. in Pharm. 1936; 3508 N. Arlington Street, Arlington, Va.

*School of Education.*—Flore Green, A.B. 1914, A.M. 1928; 3181 Tenneyson Street NW., Washington, D. C.

*School of Government.*—Roy B. Eastin, A.B. 1942, A.M. 1945 (Ph.D. 1953, American University); Government Printing Office, Washington, D. C.

*Treasurer.*—L. Jackson Embrey, A.B. 1937, LL.B. 1949, LL.M. 1949; 647 22d Street S., Arlington, Va.

*Executive Secretary.*—Mary Dow, A.B. 1933, 4734 N. 20th Street, Arlington, Va.

# THE GEORGE WASHINGTON UNIVERSITY MEDICAL SOCIETY

The George Washington University Medical Society, the organization of graduates of the School of Medicine, was established in 1905 and since 1926 has been affiliated with the General Alumni Association. The objects of the Society, as stated in the constitution, are: "The promotion of the science and art of medicine and the welfare of the School of Medicine."

1957-58

*President*.—Donald Harper Leeper, Jr. M.D. 1918 (B.S. 1912, Davidson College); 1835 I Street NW, Washington, D. C.

*President Elect*.—Helen Gladys Kahn, B.S. 1917, M.D. 1923; 1801 I Street NW, Washington, D. C.

*First Vice President*.—William Zey Fradkin, A.B. 1924, M.D. 1927; 27 Prospect Park West, Brooklyn, N. Y.

*Second Vice President*.—Frederick Young Dunn, Jr., M.D. 1941; 4800 8th Street NW, Washington, D. C.

*Secretary*.—J. Roscoe Creet, M.D. 1935; 5208 Dorset Avenue, Kentwood, Md.

*Treasurer*.—Naomi Marilyn Kanet, A.B. 1931, M.D. 1934; 1150 Connecticut Avenue NW, Washington, D. C.

## Council

Herman Solomon Hoffman, A.B. 1921, M.D. 1924; 3316 Newark Street NW, Washington, D. C.

John Hugh Lyons, M.D. 1918, B.S. 1915 (M.S. 1923, University of Minnesota); 1150 Connecticut Avenue NW, Washington, D. C.

Robert Rice Montgomery, M.D. 1923 (A.B. 1925, Lafayette College); 1746 K Street NW, Washington, D. C.

Luther Henry Snyder, M.D. 1925 (A.B. 1921, Gettysburg College); 915 19th Street NW, Washington, D. C.

Leland Ernest Stevenson, M.D. 1934; 1419 19th Street NW, Washington, D. C.

# THE GEORGE WASHINGTON LAW ASSOCIATION

The George Washington Law Association, the organization of graduates of the Law School, was founded in 1912 and has been affiliated with the General Alumni Association since 1926. Its purposes as stated in the constitution are to promote high standards of legal education, to keep the alumni of the Law School in closer touch with one another and especially with members of their own classes, to gather and publish at intervals information as to the whereabouts and activities of these alumni, and to further the interests of the Law School.

1957-58

*President.*—Joseph D. Hughes, LL.B. 1934; (B.S. 1930, Alabama Polytechnic Institute; LL.M. 1935, Georgetown University); 525 William Penn Way, Pittsburgh, Pa.

*First Vice President.*—Bernard I. Nordlinger, A.B. 1929, LL.B. 1933; 3539 Chesapeake Street NW., Washington, D. C.

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*Secretary-Treasurer.*—Elizabeth Strahan Frieret, LL.B. 1950 (B.B.A. 1942, Tulane University); World Center Building, Washington, D. C.

*Executive Committee*

Charles Oscar Berry, LL.B. 1932, A.B. 1933; 1100 H Street NW., Washington, D. C.

W. Cameron Barton, LL.B. 1921; Investment Building, Washington, D. C.

Margaret H. Earley, LL.B. 1934 (National University); 4200 Cathedral Avenue NW., Washington, D. C.

James M. Earnest, LL.B. 1932 (B.S. 1927, Alabama Polytechnic Institute); Woodward Building, Washington, D. C.

David A. Fegan, LL.B. 1932 (National University); American Security Building, Washington, D. C.

Jonathan C. Gibson, LL.B. 1923; 80 Railway Exchange Building, Chicago, Ill.

Sam Houston, LL.B. 1937 (National University); 725 13th Street NW., Washington, D. C.

Philbrick McCoy, LL.B. 1922, LL.M. 1923; The Superior Court, Los Angeles 12, Calif.

James F. Perrin, LL.B. 1937 (National University); 3027 Chestnut Street NW., Washington, D. C.

Charles Edward Pledger, Jr., LL.B. 1927; Washington Building, Washington, D. C.

John Johnson Wilson, LL.B. 1921; 815 15th Street NW., Washington, D. C.

THE LIBRARY SCIENCE ALUMNI ASSOCIATION

The Library Science Alumni Association was organized in 1932 by graduates of the Division of Library Science and became an affiliate of the General Alumni Association in 1935. It was established to foster a closer relationship between the Faculty and graduates and to further



the interests of the Division of Library Science and of the University as a whole.

1957-58

*President.*—Marguerite Vogeding Quattlebaum, A.B. in L.S. 1939; 1120 28th Street S., Arlington, Va.

*Vice President.*—Margaret A. Bird, A.B. in L.S. 1932; 732 S. Royal Street, Alexandria, Va.

*Secretary.*—Anna Moore Link, A.B. in L.S. 1933; 2530 Q Street NW., Washington, D. C.

*Treasurer.*—Florence King, A.B. 1934; 530 Cedar Street NW., Washington, D. C.

#### THE ENGINEER ALUMNI ASSOCIATION OF THE GEORGE WASHINGTON UNIVERSITY

The Engineer Alumni Association was organized in 1936 and has been affiliated with the General Alumni Association since that time. Its objects are to unite the graduates and Faculty of the School of Engineering in closer fellowship, to promote the general welfare of the School of Engineering and of the University at large, to foster activities of the engineering organizations recognized by the University, and to advance the profession of engineering in general.

1957-58

*President.*—Alfred Brox Moe, A.B. 1940, B.C.E. 1953; 130 S. Columbus Street, Arlington, Va.

*Vice President.*—Herbert Harry Rosen, B.S. in Eng. 1954; 3725 Macomb Street NW., Washington, D. C.

*Secretary-Treasurer.*—Anthony Thomas Lane, B.E.E. 1957; 1511 16th Road N., Arlington, Va.

*Corresponding Secretary.*—James J. Crenca, B.E.E. 1955; 3150 Boona Vista Terrace SE., Washington, D. C.

#### *Executive Committee*

Frank Taylor Mitchell, Jr., B.E.E. 1940; 5320 Uppenberg Street, Chevy Chase, Md.

Harry Cornelius Connor, B.S. in M.E. 1937; 4201 Sheridan Street, Hyattsville, Md.

Warren C. Crump, B.C.E. 1940; 4837 16th Street NE., Washington, D. C.

#### THE GEORGE WASHINGTON UNIVERSITY NURSES ASSOCIATION

The George Washington University Nurses Association was organized in 1914. In 1936 this organization was made an integral part of the

General Alumni Association, and graduates of the School of Nursing were accorded associate membership. The objects of the Association are to hold in unison the graduates of the George Washington University Hospital School for Nurses, to care for its sick members and to promote the advance of nursing in the interest of the George Washington University Hospital.

1957-58

*President*.—Claudine Clark Thomas, N. Cert. 1927; 1714 N. Adams Street, Arlington, Va.

*Vice President*.—Ruby Garthright Gottwals, N. Cert. 1914; 2129 19th Street N., Arlington, Va.

*Secretary*.—Ruth Pendexter, N. Dip. 1924; 1815 17th Street NW, Washington, D. C.

*Treasurer*.—Alma W. Stevens, N. Dip. 1928; 4106 Madison Street, Hyattsville, Md.

#### THE PHARMACY ALUMNI ASSOCIATION

The Pharmacy Alumni Association was organized in 1955 and is affiliated with the General Alumni Association. Its objects are to unite the graduates and Faculty of the School of Pharmacy in closer fellowship to promote the general welfare of the School of Pharmacy and of the University at large, to foster activities of the pharmacy organizations recognized by the University, and to advance the profession of pharmacy in general.

1957-58

*President*.—F. Royce Frantzoni, B.S. in Pharm. 1930; 3508 N. Abingdon Street, Arlington, Va.

*Vice President*.—Morris Corcoran Goldstein, Pharm.D. 1915; 2704 Woodley Place NW, Washington, D. C.

*Secretary-Treasurer*.—Albert Morris DeGott, B.S. in Pharm. 1951; 8500 Paloma Drive, Silver Spring, Md.

#### REGIONAL ALUMNI CLUBS

Regional alumni clubs sponsored by the General Alumni Association are maintained in the following places: Los Angeles, Calif.; Miami, Fla.; Atlanta, Ga.; Chicago, Ill.; Baltimore, Md.; Boston, Mass.; Detroit, Mich.; Kansas City, Mo.; Brooklyn, N. Y.; New York City, N. Y.; Cleveland, Ohio; Tulsa, Okla.; Philadelphia, Pa.; Pittsburgh, Pa.; Dallas, Texas; Seattle, Wash.; Milwaukee, Wis.; Arkansas; Northern California; New Jersey; Ohio River Valley; Utah; Hawaii; Philippine Islands; Puerto Rico.

Information about the officers and activities of these clubs may be obtained from the Alumni Office of the University.

# THE GRADUATE ENDEWMENT FUND

The Graduate Endowment Fund was founded by the class of 1926 with the object of providing endowment to be used for the development of the University. Membership is limited to students and graduates who sign a pledge of \$100 payable annually in ten equal installments.

The pledge notes and funds are held in trust. When the principal reaches the sum of \$10,000, the Board of Administrators of the Fund may pay the University such sums as it may vote for the erection of buildings, acquisition of sites, maintenance, and purchase of equipment. At no time may money be drawn so as to leave a balance of less than \$50,000 on deposit.

On request, the Alumni Office of the University will furnish pledge blanks to alumni.

# THE ELLIABIAN SOCIETY

The objects of this organization are: (1) the promotion of acquaintanceship among its members; (2) the advancement or betterment by the founding of scholarships in the various departments of the University; and (3) the promotion of the interests of the University.

# MEMBERSHIP

The following persons shall be eligible for active membership: (a) any woman who is currently registered or has been previously registered as a student in The George Washington University; (b) any woman member of the Faculty or Board of Trustees, and women on the administrative staff; the wife of any member of the Faculty, Board of Trustees, or of the administrative staff; (c) any woman recipient of an honorary degree from the University.

1957-58

*President*—Sally Steele McDonald, A.B. 1910, M.D. 1944, 10602 Dunkirk Drive, Silver Spring, Md.

*First Vice President*—Dora Mildred Hale, A.B. 1916, A.M. 1930, 2617 44th Road N., Arlington, Va.

*Second Vice President*—Evelyn Margaret White, A.B. 1927, A.M. 1910, 3420 14th Street NW, Washington, D. C.

*Treasurer*—Evelyn Phillips, A.B. 1934, A.M. 1947, Ph.D. 1956, 1806 Everett Street, Kensington, Md.

*Assistant Treasurer*—Margaret Gailis Dunn, A.B. 1920, A.M. 1930, 1017 First Capitol Street, Washington, D. C.

*Corresponding Secretary*—Evelyn Williams, A.B. 1934, 2032 Belmont Road NW, Washington, D. C.



*Recording Secretary.*—Ada Reed Entwisle, A.B. 1924; 3601 Connecticut Avenue N.W., Washington, D. C.

*Historian.*—Mary Murray Kochka, A.B. 1918, A.M. 1931; 5629 Lamar Road N.W., Washington, D. C.

THE WOMEN'S BOARD OF THE GEORGE WASHINGTON  
UNIVERSITY HOSPITAL

The object of this organization is to aid in every way the interests and advancement of the George Washington University Hospital. Meetings are held on the first Wednesday of each month, October to June, inclusive. Inquiries regarding membership should be addressed to the Corresponding Secretary, The George Washington University, Washington 6, D. C.

1957-58

*President.*—Mrs. Clodv Heck Marvin

*Vice President.*—Mrs. Wilbur Carr

*Vice President.*—Mrs. Walter A. Bloedorn

*Vice President.*—Miss Grace Barton

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*Assistant Corresponding Secretary.*—Mrs. Frank N. Miller

*Treasurer.*—Miss Florence W. Moyer

*Assistant Treasurer.*—Mrs. Frank R. Keeter



The George Washington University Hospital and Outpatient Department





THE SCHOOL OF MEDICINE

1957-58



THE  
GEORGE  
WASHINGTON  
UNIVERSITY  
BULLETIN

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VOL. LV

No. 8

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THE SCHOOL OF MEDICINE

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WASHINGTON 6, D. C.

PUBLISHED IN NOVEMBER  
MCMMLVI

BY THE UNIVERSITY





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# CALENDAR OF THE SCHOOL OF MEDICINE 1957-58

Date	Day	Event
1957		
Sept. 12	Thursday	Registration for the academic year 1957-58
Sept. 16	Monday	Academic year begins
Oct. 19	Sunday	1st convocation
Nov. 11	Monday	Veterans Day - Holiday
Nov. 26-27	Thursday through Saturday	Thanksgiving recess
Dec. 23-Jan. 4	Monday through Saturday	Christmas recess
1958		
Jan. 6	Monday	Classes resume
Jan. 18	Saturday	Last day of classes for the 1st semester
Jan. 20-23	Monday through Thursday	Examination period
Jan. 28	Tuesday	Classes resume for the 2nd semester
Feb. 22	Saturday	Wigman Convocation - Holiday
April 4 and 5	Friday and Saturday	Easter recess
May 12-27	Monday through Tuesday	Examination period
June 1	Sunday	Commencement
June 4	Wednesday	Commencement



## THE BOARD OF TRUSTEES

The Board of Trustees of the University is composed of the President of the University ex officio and the following persons by election:

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 Lyman James Briggs, Ph.D., S.D., D.Eng., LL.D.  
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 \*Charles Stanley White, M.D., Sc.D.  
 Lloyd Bennett Wilson

\*Nominated by the alumni.

## OFFICERS OF ADMINISTRATION

### THE UNIVERSITY

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Oswald Symister Cochrane, B.S., LL.B., LL.D., *Dean of Faculties*  
Myrna Pauline Sedgwick, A.B., *Administrative Secretary*  
Henry William Herzog, B.S., *Treasurer*  
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Benjamin Douglass Van Evert, Ph.D., S.D., *Coordinator of Scientific Activities*  
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Walter Andrew Bloodorn, A.M., M.D., Sc.D., *Dean of the School of Medicine; Medical Director of the University Hospital*  
Angus MacIvor Griffin, Ph.D., *Assistant Dean of the School of Medicine*  
Thomas Martin Peery, A.B., M.D., *Director of Postgraduate Instruction*  
Victor Frederick Laulewig, A.B., B.S., *Administrator of the University Hospital*

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### EMERITUS FACULTY

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ROGER MORRISON CHOISSEUR, B.S., M.D.  
*Professor Emeritus of Pathology*

PAUL FREDERICK DICKENS, M.D.  
*Professor Emeritus of Clinical Medicine*

WILLIAM HERNDON JENKINS, M.D.  
*Professor Emeritus of Otolaryngology*

JAMES FAENANDIS MITCHELL, A.B., M.D.  
*Professor Emeritus of Clinical Surgery*

DANIEL BRUCE MOFFETT, M.D.  
*Professor Emeritus of Otolaryngology*

GEORGE BYRON ROTH, A.B., M.D.  
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THEODORE JUDSON AHERNFETHY, B.S., M.D.  
*Assistant Clinical Professor of Medicine, Associate in Medicine, University Hospital*

JOHN PLETCH ADAMS, B.S., M.D.  
*Assistant Clinical Professor of Orthopedic Surgery, Chief of Service in Orthopedic Surgery, University Hospital, Chief, George Washington University Orthopedic Surgery Division, D. C. General Hospital*

EDWARD ADLSON, B.S., M.D.  
*Clinical Instructor in Medicine, Associate in Medicine, University Hospital*

PAUL CHARLES ADKINS, A.B., M.D.  
*Assistant in Surgery, Assistant in Surgery, University Hospital*

SAMUEL IACOB AIL, Ph.D.  
*Special Lecturer on Microbiological Chemistry*

ROY LEXIST ALBERT, A.B., M.D.  
*Assistant Clinical Professor of Medicine, Associate in Medicine, University Hospital*

\* The staff of instruction listed here will at the head of each department is for the academic year 1957-58.



SALOMON NAHTALI ALBERT, A.B., M.D.

*Clinical Instructor in Anesthesiology. Associate in Anesthesiology, University and D. C. General hospitals.*

FRANK DUANE ALLAN, Ph.D.

*Assistant Professor of Anatomy*

MELVIN GUSTAVUS ALPER, A.B., M.D.

*Clinical Instructor in Ophthalmology. Associate in Ophthalmology, University Hospital.*

LOUIS RATZ ALPERT, B.S., M.D.

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SEYMOUR ALPERT, A.B., M.D.

*Associate Professor of Anesthesiology. Associate in Anesthesiology, University and D. C. General hospitals.*

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*Associate in Neurological Surgery. Assistant in Neurological Surgery, University and D. C. General hospitals.*

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*Professor of Dermatology and Syphilology. Chief of Service in Dermatology and Syphilology, University Hospital.*

ROBERT HARPER ANDERSON, M.D.

*Clinical Instructor in Pediatrics. Associate in Pediatrics, University and D. C. General hospitals.*

WILLIAM STATION ANDERSON, A.B., M.D.

*Clinical Professor of Pediatrics. Associate in Pediatrics, University Hospital.*

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*Associate Research Professor of Physiology.*

FRANK SOLOMON BAUX, B.S., M.D.

*Associate in Medicine. Associate in Medicine, University and D. C. General hospitals.*

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*Clinical Instructor in Medicine. Associate in Medicine, University Hospital.*

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*Clinical Instructor in Medicine. Associate in Medicine, University and D. C. General hospitals.*

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*Associate Professor of Obstetrics and Gynecology. Associate in Obstetrics and Gynecology, University Hospital. Assistant Chief, George Washington University Obstetrics and Gynecology Division, D. C. General Hospital.*

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*Clinical Instructor in Medicine. Associate in Medicine, University Hospital*

HARRY CLARK BATES, B.S., M.D.

*Clinical Instructor in Medicine. Associate in Medicine, University Hospital*

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*Adjunct Professor of Public Health Practice*

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*Associate in Medicine. Associate in Medicine, University and D. C. General Hospital*

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*Assistant Clinical Professor of Orthopedic Surgery. Associate in Orthopedic Surgery, University and D. C. General Hospital*

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*Clinical Professor in Pediatrics. Associate in Pediatrics, University Hospital*

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*Professorial Lecturer in Medicine. Associate in Medicine, University Hospital*

SIDNEY BEUMAN, B.S., M.D.

*Assistant Clinical Professor of Psychiatry. Associate in Psychiatry, University Hospital*

SOLOMON FIDNEY BERSACK, B.S., M.D.

*Assistant Clinical Professor of Radiology. Associate in Radiology, University Hospital*

POLAND ELMER BIEREN, M.D.

*Clinical Instructor in Obstetrics and Gynecology. Associate in Obstetrics and Gynecology, University Hospital*

CATHARINE BIRCH, A.B., M.D.

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EMILIE ANNABELLE BLACK, B.S., M.D.

*Clinical Instructor in Pediatrics. Associate in Pediatrics, University Hospital*

BRIAN BLADES, A.B., M.D.

*Professor of Surgery. Chief of Service in Surgery, University Hospital, Chief, George Washington Postgraduate Surgery Program, D. C. General Hospital*

WALTER ANDREW BLOEDORN, A.M., M.D., S.D.  
*Professor of Medicine, Dean of the School of Medicine. Medical Director, University Hospital*

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*Associate in Medicine. Associate in Medicine, University Hospital*

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*Clinical Instructor in Psychiatry. Associate in Psychiatry, University Hospital*

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*Professional Lecturer in Pharmacology*

SARAH BISHOP BROOKS, R.N., B.S. in P.H.N.  
*Special Lecturer on Public Health Practice*

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- GEORGE BERNARD PELLEU, JR., B.S.  
*Teaching Fellow in Bacteriology*
- JOHN WAIT, JR., B.S., M.D.  
*Fellow in Physical Medicine and Rehabilitation*
- ATHANAGIOS VASILIOS AVRAMIDIS, M.D.  
*Assistant in Medicine*

STANLEY BAKER, JR., B.S., MD

*Assistant in Surgery*

THOMAS NELSON CARTER, MD

*Assistant in Medicine*

JULIA CAUSING, MD

*Assistant in Medicine*

EDWARD EUGENE CORNWELL, JR., B.S., MD

*Assistant in Surgery*

HARRISON EVERETT CURTIS, B.S., MD

*Assistant in Anesthesiology*

JAMES ARTHUR DANFORD, B.S., MD

*Assistant in Surgery*

DAVID STANLEY DAVIS, A.B., MD

*Assistant in Medicine*

VIRGINIA DUGGINS, A.M., MD

*Assistant in Medicine*

ROBERT FRANCIS DYER, MD

*Assistant in Medicine*

JEROME HAROLD EPSTEIN, A.M., MD

*Assistant in Medicine*

JESSIE ELIZABETH FAIR, M.C.S.P., P.P.T.

*Assistant in Physical Medicine and Rehabilitation*

JACK FEALY, M.D.

*Assistant in Obstetrics and Gynecology*

THOMAS DEAN FOSTER, A.B., MD

*Assistant in Obstetrics and Gynecology*

RICHARD CHOSMAN FOWLER, B.S., MD

*Assistant in Medicine*

WILFRED ERNEST GALLINER, MD

*Assistant in Medicine*

EMMETT RUSSELL HALL, JR., MD

*Assistant in Surgery*

RICHARD KESLAR HARECOM, B.S., MD

*Assistant in Surgery*

STEPHEN BARTOLE HILTBIDLE, A.B., MD

*Assistant in Surgery*

JOHN ROBERT HOLMES, A.B., MD

*Assistant in Medicine*

RUTH ELIZABETH KERR JACOEY, A.B., MD

*Assistant in Neurological Surgery*

- JAMES CHASEY KIRBY, JR., M.D.  
*Assistant in Medicine*
- ROBERT CARNEY LUCKY, A.B., M.D.  
*Assistant in Surgery*
- EDWARD MALCOLM MACON, M.D.  
*Assistant in Medicine*
- HOWARD CURR McQUARRIE, M.D.  
*Assistant in Obstetrics and Gynecology*
- TERENCE JAMES MURPHY MYLES, M.B., Ch.B., BAO  
*Assistant in Obstetrics and Gynecology*
- BARBER CLAYTON PALMER, Jr., A.B., M.D.  
*Assistant in Surgery*
- JOHN FREDERICK PAULY, M.D.  
*Assistant in Obstetrics and Gynecology*
- GERRIT PEEREBOM, M.D.  
*Assistant in Surgery*
- EDGAR ELLIOT PELTZ, A.B., M.D.  
*Assistant in Medicine*
- LOUIS ROBERT PERNA, A.B., M.D.  
*Assistant in Surgery*
- ROBERT PETER RIKER, B.S., M.D.  
*Assistant in Surgery*
- GUY HAROLD ROBINSON, M.D.  
*Assistant in Medicine*
- JACOB ROSENSWEIG, B.S., M.D., C.M.  
*Assistant in Surgery*
- FEROME ROTSTEIN, A.B., M.D.  
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*Assistant in Obstetrics and Gynecology*
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- DANIEL LAMONT SICKINGER, Jr., A.B., M.D.  
*Assistant in Surgery*
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*Assistant in Surgery*
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*Assistant in Obstetrics and Gynecology*
- LENNETT HOWARD TEAZLE, A.B., M.D.  
*Assistant in Surgery*



HOWARD ERWIN TICKETIN, A.B., M.D.

*Assistant in Medicine*

RUTH AUGUSTE VANKAL, M.D.

*Assistant in Anesthesiology*

ELIA VERNAGLIONE, M.D.

*Assistant in Anesthesiology*

WILLIAM DAVIES WALLACE, Jr., B.S., M.D.

*Assistant in Obstetrics and Gynecology*

HELEN EILEEN WEBER, B.S., R.P.T., R.N.

*Assistant in Physical Medicine and Rehabilitation*

YONOSUKE YAMASAKI, M.D.

*Assistant in Anesthesiology*

#### TECHNICAL ASSISTANTS

Fred Butner, *Technician in Physiology*

James Francis Delaney, Jr., *Photographer in Medical School Photographic Laboratory*

Cayetano Nagai, A.B., *Technician in Pathology*

John Deshon Randall, *Technician in Neurology and Neurological Surgery*

Melissent Kratz Rupp, *Technician in Biochemistry*

Eugene Field Taylor, *Technician in Anatomy*

#### PART-TIME TECHNICAL ASSISTANTS

William Charles Branche, Jr., A.B., Henry Douglas Spong, A.B., *Bacteriology, Hygiene, and Preventive Medicine*; Bess Sullivan, A.B., *Medicine*; Selma Klein, *Physiology*; Robert Claude Sullivan, A.B., *Laboratory Assistant in Animal Care*

#### ADMINISTRATIVE ASSISTANTS

Catherine Breen, *Assistant to the Dean of the School of Medicine*

Virginia Sutton Ringness, *Departmental Secretary in Obstetrics and Gynecology*

Ruth Kristens, *Departmental Secretary in Pathology*

Leatrice Crossfield, A.B., *Secretary, Office of the Dean*

Roberta McQuade Campbell, A.B., *Secretary, Office of the Dean*

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PART-TIME ADMINISTRATIVE ASSISTANTS

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## THE SCHOOL OF MEDICINE

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Walter Andrew Bloedorn, A.M., M.D., Sc.D., *Dean of the School of Medicine*

Angus MacIvor Griffin, Ph.D., *Assistant Dean of the School of Medicine*

Thomas Martin Peery, A.B., M.D., *Director of Postgraduate Instruction*

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Joseph Hyram Roe, Ph.D., *Professor of Biochemistry*

Walter Andrew Bloedorn, A.M., M.D., Sc.D., *Professor of Medicine*

Leland Wilbur Parr, Ph.D., *Professor of Bacteriology*

Winifred Overholser, A.B., M.D., Sc.D., L.H.D., *Professor of Psychiatry*

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Harry Ford Anderson, M.D., *Professor of Dermatology and Syphilology*

Preston Alexander McLendon, B.S., M.D., *Professor of Pediatrics*

John Parks, M.S., M.D., *Professor of Obstetrics and Gynecology*

Brian Blades, A.B., M.D., *Professor of Surgery*

Paul Kenneth Smith, Ph.D., *Professor of Pharmacology*

James Winston Watts, B.S., M.D., *Professor of Neurological Surgery*

Chester Elwood Leese, Ph.D., *Fry Professor of Physiology*

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Ronald Armore Cox, A.B., M.D., *Professor of Ophthalmology*

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Carleton Raymond Treadwell, Ph.D., *Professor of Biochemistry*

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Ernest Alfred Watson Sheppard, M.D., C.M., *Clinical Professor of Ophthalmology*

Thomas Carlton Thompson, B.S., M.D., *Clinical Professor of Urology*

William Staton Anderson, A.B., M.D., *Clinical Professor of Pediatrics*

\*The President of the University, the Dean of Faculties of the University, and the Registrar of the University are members of the Faculty.



Harold George Mandel, Ph.D., *Associate Professor of Pharmacology*  
 William Stanley McCane, A.B., M.D., *Associate Clinical Professor of Surgery*  
 James Jerry McFarland, Jr., B.S., M.D., *Assistant Clinical Professor of Otolaryngology*  
 Victor Frederick Ludewig, A.B., B.S., *Administrator of the University Hospital*

COMMITTEES \*

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John Parks	Brian Blades
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 Brian Blades  
 Victor Frederick Ludewig

COMMITTEE ON ADMISSIONS

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 Angus MacIvor Griffin  
 Howard Clemeth Pierpont  
 Paul Calabrisi

COMMITTEE ON CURRICULUM

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 Brian Blades  
 John Parks  
 Paul Kenneth Smith  
 Thomas McPherson Brown

COMMITTEE ON LIBRARY

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 Carleton Raymond Treadwell  
 Paul Calabrisi  
 Brian Blades  
 Thomas Martin Peery  
 Ira Rockwood Telford  
 Victor Frederick Ludewig

\* The members of the University Council and those of the School of Medicine are members ex officio of all committees.

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Thomas Martin Peery	Carleton Raymond Treadwell
Calvin Trexler Klopp	

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Thomas McPherson Brown	Thomas Martin Peery

## COMMITTEE ON HOSPITAL PRIVILEGES

Thomas McPherson Brown, *Chairman*

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Francis Liell Wenger	

## GENERAL INFORMATION

### INTRODUCTORY

The School of Medicine of The George Washington University was opened in March 1825; of the medical schools now in existence in the United States it is the eleventh in chronological order of founding. The University Hospital and Dispensary were established in 1898 and made a part of the organization of the School.

The School is a member of the Association of American Medical Colleges and is one of the medical colleges which have been continuously approved by the American Medical Association. The degrees of the School of Medicine are recognized by all state examining boards.

### PURPOSE AND AIMS

The purpose of the School of Medicine is to train physicians competent in the art and science of medicine, which includes general practice, further training for special practice, teaching, research, and medical administration.

On the undergraduate level the aims of the school are (1) to select for training students of superior aptitude and character; (2) to train students thoroughly in the theoretical principles and in the laboratory and clinical applications of the medical sciences; and (3) to provide a diversity of clinical experience with a wide range of clinical material, through well supervised clinical clerkships in federal, public, and private hospitals providing facilities for all specialized fields of medicine.

The aims of the School of Medicine in the fields of graduate and postgraduate instruction are: (1) to provide interns and residents for a number of hospitals in the Washington area for advanced training in both general and specialized practice; (2) to direct an expanding program of fundamental and applied research, integrated with teaching at the School of Medicine, and in keeping with the increasing need for medical knowledge and the growth of Washington as one of the world's great centers of medical research; and (3) to provide postgraduate instruction in the most recent advances in research and in clinical medicine.

To achieve these objectives the School of Medicine has developed the systematic plan of instruction outlined below and a balanced, comprehensive curriculum. In carrying out its program the School seeks to maintain a faculty of appropriate size and outstanding ability, to make the most effective use of the expanding University facilities, and to take full advantage of the excellent opportunities for clinical and research training in the Washington area.



## ORIENTATION PROGRAM

A distinctive curricular feature of the George Washington University School of Medicine is a program for the orientation of students entering the School which is given to them during the first week of the regular academic year. The aims of the program are: (1) to acquaint the student with the School of Medicine and with the faculty of the School of Medicine; (2) to bridge the gap between premedical and medical education; (3) to indoctrinate the student in the responsibilities and ethical principles upon which medical practice rests; (4) to help the student get an effective start in his medical studies.

The orientation course is given because it is recognized that students find medical school quite different from their previous college experience. The language is different, the techniques are more detailed, and the demands upon the students in quality and quantity of work are far more exacting. It has been found helpful to point out to the students that if at times they feel the requirements are too rigorous, they are being trained for decisions which may mean suffering or well-being, life or death for patients who ultimately will be under their care. The subjects covered in the orientation course include an interpretation of the student outlook by the President of the current senior class, a discussion of the relationship between premedical and medical education by a member of the Committee on Admissions, an introduction to the evaluation of scientific evidence, the history of the School of Medicine, an explanation of the medical curriculum by the Chairman of the Committee on Curriculum, an introduction to the Medical Library with guidance on how to use it by the Chairman of the Library Committee, a statement of the ideals and aims of the medical profession by the Dean, a brief course in the history of medicine as related to the various preclinical and clinical subjects by heads of departments, a lecture on the relationship of the physician and the law by an eminent medical legal authority, a discussion of medical ethics and the patient-physician relationship, explanation of student health program, a presentation of basic concepts of health and disease by a Professor of Medicine, and practical advice to the students on how to study, by a senior member of the faculty.

## PLAN OF INSTRUCTION

The curriculum is a graded one beginning with fundamental aspects of the basic sciences and progressing gradually with the clinical teaching of the last two years. The teaching is organized systematically under the various departments of the School of Medicine as listed under Courses of Instruction in the CATALOG.

During the first year the student receives instruction in anatomy,

biochemistry, and physiology, using the classroom and laboratory facilities of the School of Medicine. In order to emphasize the importance of the basic sciences, patients are studied from time to time and the relationship of these fundamental sciences to the clinical sciences is stressed.

In the second year, having completed the preliminary study of the structure and function of the normal body, the mechanisms of disease are considered. The various bacteria and other microbiologic agents capable of producing disease are studied in the laboratory. The effects of various diseases upon the tissues of the human body are taught in pathology, serving as a basis for the understanding of disturbed structure and function. The mode of action of the various drugs and therapeutic agents is studied in the course in pharmacology as an introduction to the use of these agents in the treatment of patients. The student is taught to conduct a physical examination and to interpret and evaluate the various symptoms of disease. During the second half of this year patients are assigned to him for case study under the close supervision of his instructors. Introductory lectures in medicine, surgery, pediatrics, obstetrics and gynecology, neurology, radiology, and psychiatry are given during this period, preparing the student for his responsibility with patients in the hospital wards and clinics.

In the third year the student is assigned to the District of Columbia General Hospital for closely supervised clinical instruction. He serves as clinical clerk in the various divisions of the hospital and assists in the preparation of the clinical records and basic laboratory examinations. He learns to perform the common ward procedures and to use diagnostic and therapeutic equipment. During this period there are daily lectures and clinical demonstrations planned in an orderly fashion proceeding from simpler to more complex problems.

During the summer period following the third year the student is required to spend eight weeks in one of the various teaching facilities of the School of Medicine. This plan permits limited electives, so that the student may explore opportunities in the various specialties not ordinarily included in the medical curriculum.

In the fourth year the student spends most of his time in the study of ambulatory patients. This instruction is given in the clinics of the University Hospital, Children's Hospital, Mount Alto Hospital, Walter Reed General Hospital, and St. Elizabeths. In these various institutions members of the faculty continue to supervise the students in their evaluation of clinical problems by a careful review of each patient, and joint planning of treatment procedures. Stress is placed upon the total individual and his environment, since it is recognized that many factors, emotional and economic as well as physical, contribute to disease and must be considered if the individual is to be restored to health and effectiveness. Instruction in the basic sciences is continued

in the fourth year in special conferences in which representatives of several departments of instruction participate.

By the completion of his four-year course the student must have demonstrated that he has acquired the basic knowledge and experience necessary for advanced training on the internship.

### THE MEDICAL CURRICULUM

Subject	Lecture	Laboratory	Conferences	Total
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#### FIRST YEAR

General Anatomy .....	112	200	—	312
Embryology and Histology .....	48	96	—	144
Neuroanatomy .....	32	64	—	96
Endocrinology .....	76	152	12	280
Physiology .....	144	100	32	276
Disease Medicine .....	16	—	—	16
Introduction to Medical Psychology .....	16	—	—	16
Psychiatry .....	16	—	—	16
Total .....	460	752	64	1,276

#### SECOND YEAR

Embryology .....	64	144	12	220
Physiology .....	60	120	40	220
Pathology .....	80	80	24	184
Physiology .....	16	—	—	16
Physiology .....	48	48	—	96
General Medicine .....	—	48	—	48
Medicine .....	84	—	—	84
Surgery .....	48	—	—	48
Hygiene .....	32	—	—	32
Pathology .....	32	—	—	32
Neurology .....	16	—	—	16
Obstetrics .....	16	—	—	16
Psychiatry .....	16	—	—	16
Psychiatry .....	16	—	—	16
Psychiatry .....	16	—	—	16
Total .....	464	376	80	1,320

\* Includes exercises and projects.



## THIRD YEAR

Subject	Lecture, Cyclopaedia, or Clinic	Clerkship	Total
Anatomy	16	—	16
Clinical Pathological Anatomy	32	—	32
Dermatology and Syphilis	16	—	16
Human Embryology	3	—	3
Medical Jurisprudence	16	—	16
Medicine	16	240	256
Medical Laboratory	—	60	60
Neurology	—	60	60
Obstetrics and Gynecology	48	120	168
Ophthalmology	12	—	12
Pathology	10	120	130
Physical Medicine	12	—	12
Psychiatry	16	—	16
Surgery	24*	240	264
Surgical OPD and Outpatient	—	60	60
Surgical OPD and Emergency	—	60	60
Therapeutic Course	16	—	16
Total	262	680	1,212

## SUMMER CLERKSHIP

Medicine, Surgery, Obstetrics and Gynecology or Pediatrics—eight weeks between third and fourth years

## FOURTH YEAR

## A) Lecture

Subject	Hours
Clinical Pathological Course	27
Physical Medicine	12
Medical Jurisprudence	12
Neurology	8
Pathology	27
Public Health Practice	5
Social Hygiene	14
Surgical Pathology	8
Total	115

\* Includes Practice and Pathology, at times

## B) Clerkship\*

Division	Weeks
Medicine .....	9
Surgery .....	9
Gynecology and Obstetrics .....	6
Pediatrics .....	6
Carotid Clinic .....	3
Psychiatry .....	3
Total .....	36

## EQUIPMENT AND FACILITIES

*The George Washington University Hospital.* The hospital, with a capacity of 400 beds, was opened in 1948. This splendid center, which is one of the outstanding hospitals in the United States, is completely furnished with the latest and most scientific apparatus and equipment. Its purpose is to supplement existing hospital resources in the District of Columbia for the care of the sick and the injured; to provide facilities for the education of physicians, nurses, and technicians; and to promote medical knowledge.

The hospital is staffed and controlled by the Faculty of the George Washington University School of Medicine and it provides excellent clinical material for the instruction of medical students. Virtually every specialty in the fields of medicine and surgery has assigned space and equipment in both the outpatient department and the bed patient section of this modern institution.

*Medical School Building.*--The building housing the School of Medicine is a five-story structure with lecture rooms, classrooms, students' rooms, and the following laboratories: anatomy; bacteriology, hygiene, and preventive medicine; biochemistry; pathology; and pharmacology and physiology.

They are fully equipped to enable students to pursue adequately the laboratory courses and to acquire the technical skill necessary in modern clinical and investigative work.

*Research Building.*--The Research Building houses special laboratories for graduate and staff research in the Departments of Anatomy; Biochemistry; Pharmacology; Physiology; and Bacteriology. Hygiene, and Preventive Medicine. Special facilities are provided for the study of radio-active compounds, for tissue culture techniques, and for virological procedures. Selected students are invited to participate in certain aspects of the research program either on a volunteer basis or with the support of special Research Scholarships.

On the first floor, the east wing is occupied by a modern medical li-

\* A three-week elective may be substituted for part of the clerkship in the division where the summer clerkship was served.

brary; the west wing houses the administrative offices of the School of Medicine. The second floor is given over to the photographic laboratories and other facilities for audio-visual aids to education.

*Medical Library.*—The Medical Library in modern, well-equipped quarters on the first floor of 1330 H Street NW. since 1955, contains 14,300 carefully selected volumes, including the new medical works and the principal medical journals.

Inter-library loan service is maintained with other medical and scientific libraries.

The Medical Library is open from 9:00 A.M. to 10:00 P.M. each class day, Monday through Friday, and from 9:00 A.M. to 5:00 P.M. Saturday.

A branch of the Medical Library is maintained in the University Hospital for the use of the resident physicians and interns.

#### GOVERNMENT MUSEUMS

The Armed Forces Institute of Pathology, on the grounds of Walter Reed Army Medical Center, affords unequalled opportunity for study of conditions met in general medicine and surgery as well as those of peculiarly military significance. Its collection of anatomical and pathological specimens comprises material received from all areas of the world and is unequalled in this country. The Museum of Hygiene, the National Museum, the Smithsonian Institution, the Botanic Gardens, and the various collections of the Department of Agriculture all afford opportunity for study of materials of special interest in various areas of Medicine and its allied sciences.

#### CLINICS

Students at the George Washington University School of Medicine receive clinical training at the University Hospital, at the new University Cancer Clinic, and at five affiliated hospitals. In the very first year the medical student begins his work in the hospital as well as in the lecture halls and classrooms.

*The University Hospital.*—All clinics are under the supervision of the Dean, who is also Medical Director of the Hospital. This insures the highest possible utilization of available clinical material for teaching purposes and the proper supervision of clinicians and students; it brings the individual student into direct contact with patients and requires him to do, under authoritative supervision, the clinical and laboratory work necessary for diagnosis and treatment, and it permits proper interpretation of the conditions occurring during the progress of cases and promotes the keeping of adequate records. Clinical and clinical pathological conferences are held in which the history of cases, the physical findings, labora-



tory records, and the post-mortem pathology when available, are presented and correlated.

*The Outpatient Department.*—The Outpatient Department has clinical facilities for each Service in the Hospital. Fourth year students are assigned in rotation by section for clinical instruction in the Outpatient Department.

*The George Washington University Cancer Clinic.*—This modern building, opened in 1954, houses the Cancer Detection Clinic; the Helen L. and Mary E. Warwick Memorial; and special Laboratories for research related to the nature, diagnosis, and treatment of cancer.

The facilities of the Cancer Detection Clinic are available to medical students. In addition the diagnosis and treatment of various forms of neoplasms are presented. The results of the treatment of neoplasms are evaluated by follow-up studies.

The Helen L. and Mary E. Warwick Memorial, for cancer and allied diseases, was affiliated with The George Washington University in July 1948. The purposes of this clinic are (1) to provide care for cancer patients, through group consultations within a cancer organization, and (2) to provide training for students and physicians in the field of oncology.

The District of Columbia General Hospital, Washington's large city hospital, has 1,420 beds and an outpatient department in which approximately 70,000 patient visits are made each year. It provides clinical opportunities in virtually every branch of medicine and surgery.

Medical students receive clinical training in certain fields at the Walter Reed Army Hospital, one of the Armed Forces' outstanding teaching hospitals. Clinical experience in both medical and surgical sciences is also provided at the Mt. Alto Veterans Administration Hospital.

At Children's Hospital, one of the largest and best known hospitals for children in the United States, medical students receive training and clinical experience in Pediatrics, with both clinic and inpatient patients.

St. Elizabeths Hospital, which has recently celebrated the tenth anniversary of its founding, is one of the world's most famous mental hospitals. This hospital cares for 7,500 patients with virtually every known psychiatric and neurological disorder. The George Washington University medical students begin their studies in psychiatry in their first year and these studies continue throughout the four years. Much of their clinical instruction in psychiatry and neurology is received at St. Elizabeths, and prominent psychiatrists and neurologists on the St. Elizabeths staff are members of the George Washington University School of Medicine faculty. Additional clinical experience in psychiatry

and neurology is gained by students at the George Washington University Hospital Psychiatric Department, in the Outpatient Department of the University Hospital, and special lectures and clinical work in child psychiatry are given in the Psychiatric Department of Children's Hospital.

#### ADMISSION

Ninety hours of credit applicable toward a degree in this University or another college of liberal arts and sciences are required for admission to the School of Medicine.

A semester hour represents one class hour or a minimum of two laboratory hours a week for a period of approximately sixteen weeks.

#### PREMEDICAL COLLEGE REQUIREMENTS

##### Ninety Semester Hours

A minimum of ninety semester hours of credit, applicable toward a degree in this University or in another approved college of liberal arts, is required for admission to the School of Medicine. A semester hour represents one class hour or a minimum of two laboratory hours a week for a period of approximately sixteen weeks. A credit earned at an institution operating on the quarter system is the equivalent of two-thirds of a semester hour. Specific required courses are:

1. Chemistry as follows: (a) eight semester hours in general inorganic chemistry, of which at least four hours are laboratory work (qualitative analysis may be counted as general inorganic chemistry); (b) six or eight semester hours, the equivalent of one year college course of organic chemistry including laboratory work.

2. Physics, eight semester hours, of which at least two hours are laboratory work.

3. Biology, eight semester hours, of which at least four hours are laboratory work. This requirement may be satisfied by a course of eight semester hours in either general biology or zoology.

4. English composition and literature, six semester hours; the usual introductory college course or the equivalent.

Academic ability is evaluated on the basis of general quality-point index, scientific index, grade of studies, specific interests and yearly progress. Well qualified candidates are eligible for admission after completing the essential premedical college requirement. However, a high percentage of students are found qualified for the study of medicine after four years of college work.

## ADVANCED STANDING

A student who has satisfactorily completed one or two years at any other medical school approved by the American Medical Association, and who has the necessary preliminary educational requirements, may apply for advanced standing.

## APPLICATION FOR ADMISSION

1. Full directions for application will be furnished on request. The applicant should ask the registrar of each college previously attended to send an official transcript of record to the Director of Admissions, The George Washington University, 2020 G Street NW., Washington 6, D. C. Photostatic copies of credentials without the original signature of the certifying authority are not satisfactory. It is the responsibility of the applicant to see that all credentials are forwarded to the Director of Admissions of the University.

2. Two recent photographs, with signatures, are required of each applicant.

3. Applicants for admission are required to take the Medical College Admission Test, sponsored by the Association of American Medical Colleges, in advance of the academic year for which application is made.

4. A fee of \$10 to defray the costs of completing the records for final consideration for admission must accompany each application.

## Selection Procedure

The Committee on Admissions is guided in the selection of students by the applicant's academic ability, the results of the Medical College Admission Test, and personal qualifications as determined by letters of reference and personal interview. Applicants are interviewed only by invitation of the Committee.

## REGISTRATION

For the academic year 1957-58, registration will be conducted at the Medical School, 1335 H Street NW., from 10:00 A.M. to 4:00 P.M., September 15. Registration is for a period of one academic year.

## FEES AND FINANCIAL REGULATIONS

The following fees have been adopted:

Tuition fee, for each academic year .....	\$1,000.00
Fee for special examinations, for each subject .....	5.00
Graduation fee .....	25.00



#### PAYMENT OF FEES

Fees for each semester are \$450.00, payable in advance.

All fees are payable at the Office of the Cashier of the University, 725 Twenty first Street NW. Fees due must be paid at the time of registration, no student is permitted to complete registration or to attend classes until fees are paid.

Registration in the School of Medicine is for a period of one academic year. After the student has entered the courses of instruction he is obligated for the full tuition for the academic year. No part of the tuition will be refunded upon withdrawal or dismissal for any cause. Acceptance by the School of a student's fees does not in any way obligate the School to accept the student for any subsequent year, and the right is reserved to drop any student from the School whenever, in the interest of the student or the School, the Faculty deems it advisable to do so.

Because the number of applicants far exceeds the limit of each class, places can be reserved only for those qualified applicants who remit a deposit of \$100 which will be credited toward the tuition of the first semester. Under no circumstances will this deposit be refunded.

Credit for work will not be given until, at the completion of a laboratory course, the student has replaced or paid for all articles of equipment or other University property which he has lost, broken, or destroyed. All breakage or loss not directly traceable to an individual student is assessed pro rata.

#### COST OF TEXTBOOKS AND STUDENT EQUIPMENT

The minimum cost of necessary textbooks and student equipment (microscope, drawing materials, glass slides, clinical thermometer, stethoscope, hemocytometer, uniforms, etc.) is approximately as follows: first year, \$400; second year, \$250; third year, \$125; fourth year, \$80; total \$855.

A fee of \$1 a semester is charged for the use (optional) of a locker.

#### FELLOWSHIPS AND GRADUATE ASSISTANTSHIPS

The following fellowships and graduate assistantships are available. Applications should be submitted not later than April 1 preceding the period for which the award is to be made.

*University Teaching Fellowships*—These are assigned for the academic year to the various Departments of instruction. The applicant is expected to be a prospective candidate for a Doctoral degree, and to have a Master's degree or equivalent in the general field of his future doctoral study. Each Teaching Fellow receives an annual stipend (on a nine-month basis) of up to \$1,150 (plus full tuition for whatever sched-

ule of study or research his fellowship duties permit him to carry. The University Teaching Fellow normally renders half-time service in classroom or laboratory assignments to the department of instruction directing his doctoral study. Application forms for these fellowships may be obtained from the executive officer of the department concerned.

*Graduate Teaching Assistantships.*—These are open in various departments of instruction to candidates for the Master's degrees. Each graduate teaching assistant renders a designated unit of service to his major department of instruction, and receives, depending upon his teaching or laboratory assignment, up to \$1,215 on a nine-month basis plus tuition for the program of studies which the duties of his assistantship permit him to carry. Application should be made to the executive officer of the department of instruction concerned.

*Special Fellowships.*—Special fellowships are supported by endowment, and are awarded to candidates or prospective candidates for the degree of Doctor of Philosophy of unusual promise and ability. The stipend is not fixed but varies in amount with the need of the individual receiving the award. In applying for one of these fellowships it is advantageous that the student appear personally for an interview with the Chairman and such other members of the Graduate Council as would be interested in the research investigations proposed. These fellowships include the Thomas Bradford Sanders Fellowships.

*Robin Miller Fellowship.*—A fellowship in medicine in the amount of \$1,800, established in 1953 by bequest from Mrs. Robin Miller, is offered for the study of cardiovascular diseases.

#### SCHOLARSHIPS AND PRIZES

Scholarships are awarded for two semesters unless otherwise specified and are awarded in equal parts for each semester. Each holder must carry a full schedule of academic work during the period for which the scholarship is awarded. Applicants (except in the case of the Daughters of the American Revolution Scholarship and the Eugene and Agnes E. Meyer scholarships) must have established an academic record in courses at this institution and should apply on prescribed form which must be filed in the Office of the Chairman of the Committee on Scholarships not later than April 1 preceding the academic year for which the scholarship is to be awarded. Further information concerning the following scholarships may be obtained from the Chairman of the Committee on Scholarships, The George Washington University, Washington 6, D. C.

*Anna Bartch Scholarship.*—This scholarship, in the amount of \$500, established in 1946 by Dr. Anna Bartch-Dunne, as a memorial to her mother, Anna Bartch, is available to a woman in the School of Medicine of outstanding scholarship, character, and promise, who intends

to make the practice of medicine her life profession". The award is made upon the recommendation of the Faculty of the School of Medicine. For the year 1955-56 this scholarship was awarded to Sarah Pamela Leech.

*Everett Lamont Bradley Scholarship.*—This scholarship, in the amount of \$100, established in 1984 by request of Alice R. H. Bradley in memory of her son, Everett Lamont Bradley, is available to a student in the School of Medicine.

*Laura K. Carr Scholarship.*—Six scholarships in the amount of \$400 each and ten of \$100 each, established in 1932 by Mrs. Laura K. Carr, are available to "young men (of the white race) for undergraduate or postgraduate work, considering character, capacity, and need".

*Maria M. Carter Scholarship.*—This scholarship in the amount of \$100, established in 1871 by Mrs. Maria M. Carter, is available to a young man.

*Isaac Davis Scholarship.*—This scholarship, in the amount of \$80, was established in 1864 by the Honorable Isaac Davis of Massachusetts. Nominations for the scholarship may be made "by the father or his eldest lineal descendant". In case no such nomination is made, the scholarship is to be awarded by the University.

*Hazleton Scholarship.*—This scholarship, in the amount of \$350, established in 1950 by the bequest of Lillie S. Hazleton, is awarded annually "for the use and assistance of needy and worthy students".

*Eugene and Agnes E. Meyer Scholarship.*—A scholarship fund in the amount of \$1500, established in 1952 by the Eugene and Agnes E. Meyer Foundation, is available annually "to assist promising students or applicants in meeting the costs of furthering their education, with preferential consideration to children of persons who are employed in public service, including service in the armed forces or the judiciary."

*John O'Donnell Prize.*—This prize of \$150 is awarded annually to the member of the graduating class of the School of Medicine who has completed the four year medical course with the highest scholastic standing. In 1955-56 this prize was awarded to Oscar Irving Dadek, Jr.

*The Zonta Club of Washington, D. C., Scholarship.*—This scholarship, in the amount of \$200, offered by the Zonta Club of Washington, D. C., is available to a woman who is a senior or graduate student with special interest in a professional or business career. In 1955-56 this scholarship was awarded to Brigitte Klara Buchmann.

Special Research Scholarships, supporting part-time work in the various departments, have been made available to selected medical students through grants by the Loebl Laboratories, the National Foundation for Infantile Paralysis, and the National Institutes of Health.



## FINANCIAL AID

## INTERNSHIP

In memory of her mother, Anna Bartsch, Dr. Anna Bartsch-Dunne established in 1946 a fund which provides \$15 a month to aid in the support of an internship in the University Hospital. This internship, awarded annually, was awarded for the year 1956-57 to Helen May Worsencroft.

## LOAN FUNDS

The following loan funds are available to students in the University in accordance with the qualifications placed thereon by the donors. Inquiries should be directed to the Office of the Treasurer.

*University Loan Fund.*—The Trustees of The George Washington University have established a loan fund.

*Harris Loan Fund.*—This fund, established by George W. Harris, is available for loan to an orthopedic rehabilitation student.

*Kellogg Medical School Loan Fund.*—The W. K. Kellogg Foundation in Battle Creek, Michigan, has established a loan fund for students in the School of Medicine.

*School of Medicine Loan Fund.*—This fund, contributed by medical students, is available for loans to students in the School of Medicine.

*Pfizer Medical School Loan Fund.*—The Chas. Pfizer & Co., Inc., has established a fund for loans to students in the School of Medicine.

*Henry Strong Educational Foundation.*—The Henry Strong Educational Foundation, established at Chicago under the will of General Henry Strong, makes available a fund for loans to both men and women students under the age of twenty-five years.

*Sutherland Medical School Loan Fund.*—This fund, established by Mrs. Rose L. Sutherland, is available for loans to students in the School of Medicine.

## REGULATIONS

*Students in the School of Medicine are subject to, and are expected to familiarize themselves with, the general University regulations stated in the University Catalogue.*

## ABSENCE

Absence consists in being away from a class or clinic during a scheduled period, entering after the class or clinic has begun, or leaving before either is dismissed.

Excuse for absence due to sickness must be accompanied by a certificate signed by the attending physician and must be filed in the Office of the Dean.

For every unexcused absence a department will deduct one-half of one per cent from the student's final grade in the subject involved.

#### GRADES

The following grading system is used: *A* (90-100); *B* (80-89); *C* (75-79); *D* (65-74) condition; *E* (below 65) failure; *Inc.*, incomplete, the passing grade in each subject is *C*.

A student conditioned in any subject will not be advanced until such condition is removed and then only by authority of the Committee on Scholarship.

#### EXAMINATIONS

Examinations, which may be written, oral, or practical, will be held at the end of each semester.

All students in the School of Medicine are required to take Part I and Part II of the National Board Examinations, except that students from those states and foreign countries which do not recognize the National Board may be exempted from Part II by action of the Committee on Scholarship.

#### APPLICATION FOR GRADUATION

Application for a degree should be filed in the Office of the Registrar at the time of registration for the senior year.

#### RIGHT TO DISMISS STUDENTS

The right is reserved by the University to dismiss or exclude any student from the University, or from any class or classes, whenever, in the interest of the student or the University, the University Administration deems it advisable to do so.

#### RIGHT TO CHANGE RULES

The University and its various colleges, schools, and divisions reserve the right to modify or change regulations, rules, and fees. Such regulations shall go into force whenever the proper authorities may determine.

#### HEALTH ADMINISTRATION

The University maintains a health service that is primarily diagnostic in its intent. It also provides first aid in the event of an emergency.

Medical privileges include: (1) the physical examination of all entering students; (2) those visits by the University physician or surgeon.

office or residence (District of Columbia) in any one illness, exclusive of a specialist, surgical operation, laboratory, or X-ray examination; (3) hospitalization, including board and nursing, in the University Hospital for not more than one week during any twelve month period—the necessity to be determined by the Director of Health Administration. The duration of hospitalization period (maximum, one week) is also to be determined by the Director of Health Administration.

This medical benefit does not apply to illness or disability incurred previous to the University semester or prior to payment of tuition fees.

The student is allowed, if he so desires, to engage physicians and nurses of his own choice, but when he does so he will be responsible for the fees charged.

Rules: (1) The Director of Health Administration is empowered to limit or deny the medical benefits where, in his discretion, a student has by his misconduct or breach of the rules of the University, made himself ineligible; (2) the Director of Health Administration has authority to determine the necessity and length of hospitalization; (3) a student who has severed his connection with the University is ineligible for medical benefits.

#### PHYSICAL EXAMINATIONS

All first-year students are given a comprehensive physical examination upon admission to the School of Medicine. The students are informed of the findings and advised regarding such measures as will tend to maintain a high standard of health.

In addition medical students benefit from the complete Tuberculosis Case Finding Program which the School has maintained since 1938-39. Under this program all students receive tuberculin tests, X-ray examinations, and such special attention from chest specialists as is necessary to reduce to a minimum the dangers from tuberculosis. Students are immunized against those diseases for which proven prophylactics exist.

#### LIVING ACCOMMODATIONS AND LIVING EXPENSES

Washington provides a wide variety of residential accommodations for students, rooms, apartments, and houses, furnished and unfurnished, at a wide range of rentals. Married students are eligible for various low rental housing projects. Single students frequently find they can live economically in small groups by sharing apartments. The cost of food, clothing, and other essentials in Washington is comparable to that in other cities.

#### LIVING ACCOMMODATIONS

*Women Students.*—The Hattie M. Strong Residence Hall provides single rooms at \$18 a month and double rooms at \$20 a month a person.



Meals are served at the Student Union. Admission to the University does not include dormitory reservation. A separate application for a room should be made well in advance (for the fall semester by May first, for the spring semester by January first). Forms for application, together with detailed information, may be obtained from the Director of Activities for Women.

Girls under the age of twenty-one who are enrolled for twelve or more semester hours of academic work in the University and who are not living with their parents or relatives may live outside the dormitory only with the permission and approval of the Director of Activities for Women, upon receipt of written requests from parents. In no case will permission be granted for such girls to be domiciled outside the dormitory, except with persons approved by the Director of Activities for Women.

*Men Students.*—Welling Hall provides double room facilities for 102 students. Rooms rent for \$24 a month a person. Dining facilities are available to all residents. Meals are also served at the Student Union. Application forms for reservations may be obtained from the Director of Activities for Men.

Information concerning private rooming and boarding facilities near the University for women students twenty-one years of age or older and for men students may be obtained at the Housing Office, Lisner Auditorium, 720 Twenty-first Street, NW. The reservation of rooms in private houses must be made by students.

### RECREATION

The nation's capital provides abundant recreational resources, a large number of which are available at little or no cost. There are museums, art galleries, parks, concert halls, theaters, swimming pools, sports, and places of great historic interest. There are, in addition, the most numerous recreation facilities found in a large city. Social activities are provided by student organizations of the University, the School of Medicine, and other student groups. Almost every religious faith is represented in Washington by one or more churches, and such religious, educational, social, and recreational activity is conducted by the various church groups. There are innumerable other cultural and educational facilities in Washington to meet almost any possible individual need or preference of a medical student and his family.

### THE DEGREE OF DOCTOR OF MEDICINE

Upon the satisfactory completion of the requirements of the School of Medicine, the degree of Doctor of Medicine is conferred.

## REQUIREMENTS FOR THE DEGREE

Every candidate for graduation with the degree of Doctor of Medicine must be at least twenty-one years of age, of reputable character, and free of all indebtedness to the University. He must have satisfied the admission requirements, completed satisfactorily not less than four academic years of study as a matriculated student in Medicine, completed all required courses, and passed satisfactorily all prescribed examinations.

## COMBINED ARTS AND MEDICINE CURRICULUM

In order to be recommended for the degree of Bachelor of Arts, the candidate must complete at least ninety semester hours of prescribed college work (at least thirty hours and one year of residence must be completed in Columbian College, the senior liberal arts college), and the first year of the medical curriculum. Upon satisfactory completion of the fourth year of the medical curriculum the student becomes eligible for the degree of Doctor of Medicine.

## HONORS

A candidate who has completed the four-year medical course with an average grade of 90 may be recommended for graduation "with distinction."

## HONOR SOCIETIES

*William Beaumont Medical Society.*—Medical students showing unusual ability are elected by the active members of this society, which was founded to encourage and stimulate individual investigation.

*Howard Kane A. F. A. King Obstetrical Society.*—The fifteen students in the third and fourth year classes who maintain the highest grades in their work in obstetrics are eligible for membership.

*Smith-Reed-Russell Society.*—Students of the third and fourth years who maintain a scholastic average of 88 per cent are eligible for membership.

*Alpha Omega Alpha*—National Honor Medical Society. Members of the Junior and Senior Classes meeting the qualifications specified by the constitution of the Society are eligible for election to membership.

## INTERN AND RESIDENT TRAINING PROGRAM

The George Washington University Hospital offers rotating type internships as directed by the National Intern Matching Program, Inc. Twenty-five internships of one year each are offered; thirteen in the Department of Medicine with emphasis on medicine, ten in the Depart-

ment of Surgery with emphasis on Surgery, and two in the Department of Pathology with emphasis on pathology.

*Rotating Internships, Emphasis on Medicine.*—Interns will be assigned to seven months of general medicine, two months on the surgical service, and one month each on neuropsychiatry, pediatrics, and obstetrics and gynecology.

*Rotating Internships, Emphasis on Surgery.*—Interns will be assigned to the surgical service for nine months, to general medicine for two months, and to obstetrics and gynecology for one month.

*Rotating Internships, Emphasis on Pathology.*—Interns will be assigned to the pathology service for six months, to general medicine for two months, to surgery for two months, to pediatrics for one month, and to obstetrics for one month.

A total of approximately forty-two approved residencies are offered in anesthesiology, cardiac diseases, internal medicine, neurologic surgery, obstetrics gynecology, oral surgery, pathology, physical medicine, psychiatry, roentgenology, surgery and thoracic surgery. Residency programs are of from one to four years depending upon the service. Appointments are for one year subject to renewal. In several of the fields there are affiliations with local and government hospitals.

Fellowships of one or two years are available to acceptable candidates in anesthesiology, cardiology, chest diseases, infectious diseases, outpatient service, physical medicine, rheumatic diseases, surgery and thoracic surgery.

For application blanks and further information, address the Superintendent, The George Washington University Hospital, Washington 7, D. C.

#### POSTGRADUATE INSTRUCTION

The School of Medicine offers annually a program of intensive postgraduate instruction, varying somewhat from year to year. The program is designed for physicians in practice. The application of the basic sciences to clinical practice is stressed.

The Kellogg Medical Lectures, inaugurated in 1948, are a series of evening lectures, presented by distinguished physicians from other cities, designed primarily for physicians practicing in Washington and the vicinity. They are also attended by the Faculty, postgraduate students, and members of the senior class of the School of Medicine.

During the academic year 1948-49 approximately 150 physicians were enrolled in postgraduate courses. For further information, address the Director of Postgraduate Instruction, The George Washington University Hospital, Washington 7, D. C.



## MEDICAL TECHNOLOGIST COURSE

The course for medical technologists consists of twelve consecutive months of didactic and practical work in all phases of clinical laboratory technique. The course meets the full requirements of the Registry of Medical Technologists of the American Society of Clinical Pathologists. Prerequisite: the Basic Course in Medical Technology offered by the Junior College of The George Washington University, or the equivalent.

Two classes are accepted each year, one entering in September and the other in March. Enrollment in each class is strictly limited so that personal instruction can be given.

Upon satisfactory completion of the course a certificate is awarded and the candidate is eligible for the certifying examination given by the Registry of Medical Technologists.

For application blanks and further information, address the Director of Laboratories, The George Washington University Hospital, Washington 7, D. C.

## COURSES OF INSTRUCTION

On the following pages of this BULLETIN, under the alphabetically arranged names of the departments of instruction, are listed the courses of instruction offered by the School of Medicine. The School of Medicine serves other divisions of the University by making available to non-medical students certain undergraduate and graduate courses in the following fields: Anatomy, Bacteriology, Biochemistry, Pathology, Pharmacology, Physical Medicine, and Physiology. The courses listed are subject to some slight change. The University reserves the right to withdraw any course announced.

### EXPLANATION OF COURSE NUMBERS AND SYMBOLS

A number in parenthesis after the name of a course, indicates number of semester hours or credit which may be earned by nonmedical students.

First year courses are numbered from 101 to 200; second-year courses, from 201 to 300; third year courses, from 301 to 400; and fourth-year courses, from 401 to 500.

*Courses offered in the School of Medicine for nonmedical students.*—Courses numbered from 101-200 are planned for upper-division students in undergraduate curricula. They may be credited toward higher degrees only when registration for graduate credit has been approved at the beginning of the course by the dean responsible for the graduate work and by the officer of instruction, and when the completion of additional work has been certified by the officer of instruction. Courses numbered from 201 to 300 are planned for graduate students.

## ANATOMY

Ira Rockwood Telford, Ph.D., *Professor of Anatomy, Executive Officer*  
 Paul Calabrisi, Ph.D., *Professor of Anatomy*  
 Webb Edward Haymaker, M.D., M.S., *Professorial Lecturer in Anatomy*  
 Gerald Fred Hungerford, Ph.D., *Assistant Professor of Anatomy*  
 Frank Duane Allan, Ph.D., *Assistant Professor of Anatomy*  
 Thomas Nick Johnson, Ph.D., *Assistant Professor of Anatomy*  
 Dora Papara-Nicholson, M.D., *Assistant Research Professor of Anatomy*  
 Wilfred Walter Eastman, B.S., M.D., *Clinical Instructor in Anatomy*  
 Lloyd Eugene Church, D.D.S., M.S., *Clinical Instructor in Anatomy*  
 Raymond Nathan Brown, M.D., *Clinical Instructor in Anatomy*  
 Lyle Westley Williams, A.B., M.D., *Clinical Instructor in Anatomy*  
 Herbert Koro Kashwa, M.S., *Fellow in Anatomy*

### 101-2 *General Anatomy*

Calabrisi and Staff

Autumn year: Fall—12 hours a week, Spring—8½ hours a week  
 General function of the human body, supplemented with human and non-human. Study of Nerve system to emphasize its functional aspects of the central, dorsal, and ventral components.

### 103 *Human Embryology*

Allan and Staff

Fall—1 hour a week  
 The origin and development of the human body. Study emphasis on the origin of individual organs, emphasizing anatomical position and position of organs in adult condition, origin, structure, and function.

### 104 *Neuroanatomy*

Johnson and Staff

Spring—1 hour a week  
 The development and anatomy of the central nervous system and the cranial nerve system. Emphasis on such anatomical structures as brainstem, pathways, brain, etc.

### 105 *Microscopic Anatomy*

Telford and Staff

Fall—1 hour a week  
 Study of the detailed anatomical structure of cells, tissues, and organs of the human body with emphasis on the relation of structure to function. Discussion and comparison of histological sections stained by practical examination.



- 100 *Living Anatomy* The Staff  
 Spring—1 hour a week.  
 An introduction to physical anatomy, with special emphasis on topographical anatomy.
- 201-2 *Gross Anatomy* (8-16) Caldwell and Staff  
 Academic year—two arranged.  
 For qualified non-medical graduate students. Same as Anatomy 101-2.  
 Anatomy 201—laboratory fee, \$21; Anatomy 202—laboratory fee, \$20.
- 203 *Human Embryology* (2-2) Allen and Staff  
 Fall—two arranged.  
 For qualified non-medical graduate students. Same as Anatomy 103.  
 Laboratory fee, \$8.
- 204 *Neuroanatomy* (4) Johnson and Staff  
 Spring—two arranged.  
 For qualified non-medical graduate students. Same as Anatomy 104.  
 Laboratory fee, \$13.
- 205 *Microscopic Anatomy* (4) Telford and Staff  
 Fall—two arranged.  
 For qualified non-medical graduate students. Same as Anatomy 105.  
 Laboratory fee, \$13.
- 221-22 *Scrapings* (1-1) Hungerford and Staff  
 Academic year—1 hour a week—two arranged.  
 Reports and discussions of animal scrapes by the Staff and post-graduate students. For graduate degree and students. Research medical students are encouraged to attend.
- 275-76 *Research* (1-1) The Staff  
 Academic year—two arranged.  
 For M.D. students.
- 297-300 *Theses* (2-3) The Staff

## ANESTHESIOLOGY

Charles Seymour Coakley, M.D., *Professor of Anesthesiology, Executive Officer*

Donald Harrison Stubbs, A.M., M.D., *Clinical Professor of Anesthesiology*

Seymour Alpert, A.B., M.D., *Associate Professor of Anesthesiology*

Cunningham Ramsey MacCordy, M.D., *Associate in Anesthesiology*

Paula Reines Kaiser, M.B., Ch.B., M.D., *Instructor in Anesthesiology*

Sabumon Naphtali Albert, A.B., M.D., *Clinical Instructor in Anesthesiology*

William Eldridge Bageant, M.D., *Clinical Instructor in Anesthesiology*

Allen Widome, M.D., *Clinical Instructor in Anesthesiology*

Charles Gruenwald, A.B., M.D., *Clinical Instructor in Anesthesiology*

Harrison Everett Curtis, B.S., M.D., *Assistant in Anesthesiology*

Ruth Auguste Vankai, M.D., *Assistant in Anesthesiology*

Ella Veruglione, M.D., *Assistant in Anesthesiology*

Yonosuke Yamasaki, M.D., *Assistant in Anesthesiology*

### 320 *Anesthesiology*

The Staff

Spring—1 hour a week.

Review of basic sciences, correlation between basic sciences and clinical work.

### 421-22 *Anesthesia Seminar*

The Staff

Academic year—1 hour a week.

Students attend anesthesia seminars during their surgical clinical clerkships. University Hospital.

### 433-34 *Advanced Anesthesiology*

The Staff

Academic year—as arranged.

Students are present through the work of the Department for a period of one week and assigned to work in the operating room and in the intensive care unit. For the most advanced students a three-week course is offered.

## BACTERIOLOGY, HYGIENE, AND PREVENTIVE MEDICINE

- Leland Wilbur Parr, Ph.D., *Professor of Bacteriology, Executive Officer*  
 Angus MacIvor Griffin, Ph.D., *Professor of Bacteriology*  
 Ralph Gregory Beachley, M.D., Dr.P.H., *Adjunct Professor of Public Health Practice*  
 Mary Louise Robbins, Ph.D., *Associate Professor of Bacteriology*  
 William Gray McCarten, M.S., *Assistant Professor of Bacteriology*  
 Randolph Hugh, Ph.D., *Assistant Research Professor of Bacteriology*  
 William Donald Hann, B.S., *Associate in Bacteriology*  
 Charles Francis McCaffrey, M.D., *Clinical Instructor in Preventive Medicine and Public Health*  
 Charles Joseph Haslam, B.S., *Teaching Fellow in Bacteriology*  
 Deborahah Berg Jabal, A.B., *Sanders Fellow in Bacteriology*  
 George Bernard Pelieu, Jr., B.S., *Teaching Fellow in Bacteriology*

### SPECIAL LECTURERS

- Chester Wilson Edwards, Ph.D., *Chief, Medical Mycology Unit, Laboratory of Infectious Diseases, National Microbiological Institute, National Institutes of Health; Medical Mycology*  
 Willard Hall Wright, D.V.M., Ph.D., *Chief, Laboratory of Tropical Diseases, National Microbiological Institute, National Institutes of Health; Medical Zoology*  
 John Roderick Heller, Jr., B.S., M.D., *Director, National Cancer Institute, National Institutes of Health; Cancer Control*  
 Robert Carter Cook, *Director, Population Reference Bureau; Editor, Journal of Heredity; Medical Genetics*  
 Robert Henry Felix, M.D., M.P.H., *Director, National Institute of Mental Health, National Institutes of Health; Mental Hygiene*  
 Francis Byron Gordon, Ph.D., M.D., *Head, Pathology Division, Naval Medical Research Institute, Naval Medical Center, Virology*  
 Edward Kramer Froelicher, B.S., *Executive Secretary, District of Columbia Tuberculosis Association; Community Health Resources*  
 Samuel Jacob Ait, Ph.D., *Chief, Microbiological Chemistry, Department of Bacteriology, Army Medical Service Graduate School; Microbiological Chemistry*  
 Sarah Ellen Hook, B.S., Ph.D., *Director, Division of Public Health, National Jackson County Health Department; Public Health Practice*



Martin Marc Cummings, B.S., M.D., *Chief, Research and Education Service, Department of Medicine and Surgery, Veterans Administration; Medical Bacteriology*

Morris Cecil Leikind, M.S., *Chief, Historical Research Division, Medical Museum, Armed Forces Institute of Pathology; History of Microbiology*

### 112 *General Bacteriology* (4)

Robbins

Spring—Mon., Wed., and Fri., 9 A. M. to 12:00 A. M.

For premedical students. A study of the fundamentals of bacteriology, including bacterial classification. Methods of cultivation and control of several genera of microorganisms are studied in the Alexander-Petersen laboratory. Any laboratory laboratory science, Chemistry 11-12. Laboratory fee, \$13.

### 209 *Medical Microbiology* (1-11)

Parr, Griffin

Fall, lecture (1 hour), laboratory (1½ hours)—as arranged

Bacteria, rickettsia, virus, yeast, mold, protozoa, and metazoa which relate to the human and animal as well as plant study of most important forms; methods of diagnosis by microscopy, cultural, immunologic, and animal reactions. Theory and methods of immunization, vaccines, serum, antitoxins. Open to faculty prepared students. History may be covered as a whole or in part by adding the appropriate letter to the course number, with credit allocated as follows: 141 *Bacteriology*, including rickettsia and virus—lecture (14), laboratory (11); 142 *Parasitology*, including medical parasitology—lecture (14), laboratory (11); 143 *Immunology* (14). May be taken by a limited number of students for Master's degree. Laboratory fee, \$4.50 for each semester hour of laboratory work.

### 210 *Fundamentals of Epidemiology and Public Health* (2)

Parr and Staff

Spring—Mon., 2:00 to 4:00 P. M.

Sources, modes, and implications of infection and injury. Consideration also given the problems of diagnosis and industrial medicine (Open to those are graduate students). Prerequisite: Bacteriology 112 or 209.

### 217-20 *Advanced Microbiology* (arr.)

Griffin and Staff

Admission year—as arranged

Special study of advanced methods and current problems in microbiology for possible graduate research specialization in microbiology. Prerequisite: Bacteriology 112 or 209. Chemistry 151-152 or the equivalent permission of the instructor. Laboratory fee, \$4.50 per semester hour.

- 230 *Statistics in Microbiology* (3) Griffin  
1957-58 and alternate years  
The application of statistical methods to the problems of microbiology. For liberal arts graduate students. Prerequisite: entrance or elementary college algebra.
- 232 *Immunological Methods* (3) McCaiken  
1958-59 and alternate years  
Preparation and testing of serological materials. Demonstration of basic serological phenomena. For liberal arts graduate students. Prerequisite: Bacteriology 112 or 209 and permission of the instructor. Laboratory fee, \$11.
- 234 *Toxicology* (6) Robbins  
1957-58 and alternate years  
Study of viruses and rickettsiae. Lectures and laboratory exercises. For liberal arts graduate students. Prerequisite: Bacteriology 112 or 209 and permission of the instructor. Laboratory fee, \$15.
- 240 *Advanced Epidemiology and Public Health* (3) Parr  
1957-58 and alternate years  
Continuation, reviews, and problems for graduate students dealing with specialized and advanced phases of the topics presented in Bacteriology 217. Prerequisite: Bacteriology 210.
- 293-94 *Staff Seminar* (1-1) The Staff  
Academic year—as arranged  
For liberal arts graduate students. Biweekly throughout the year.
- 295-96 *Retreat in Bacteriology* (3-1) The Staff  
Academic year—as arranged
- 297-300 *Thesis* (3-3) The Staff
- 340 *Health Resources Survey* Beachley and Staff  
Spring—4 hours a week for 3 weeks, summer 1959—Independent study.  
A survey of available medical care from first contact, through laboratory and clinical diagnosis, diagnosis, therapeutic medical or surgical treatment or self therapy and community rehabilitation. Case histories analyzed in their relation with the cooperation and assistance of the clinical departments. Comparison is to be made between care in community health services in Kansas where the student picks his own topic. Emphasis is on evaluation of the present practice of medicine and community public health and welfare activities, both tax supported and voluntary. Emphasis on basic point of view is assumed.

401 *Public Health Practice*

Beachley and Staff

Fall—1 hour a week for 5 weeks.

Study of public health practice at national, state, city, and county levels. Public and private agencies.



## BIOCHEMISTRY

Joseph Hyram Roe, Ph.D., *Professor of Biochemistry, Executive Officer*  
 Carleton Raymond Treadwell, Ph.D., *Professor of Biochemistry*  
 Bernard Leonard Horecker, Ph.D., *Professional Lecturer on Enzymes*  
 William Robert Carroll, Ph.D., *Professional Lecturer on Proteins*  
 Irving Gray, Ph.D., *Professional Lecturer on Isotopes*  
 Benjamin Williams Smith, Ph.D., *Assistant Professor of Biochemistry*  
 Harold William Clark, Jr., Ph.D., *Associate in Biochemistry*  
 George Vastkes Vahouny, M.S., *Instructor in Biochemistry*  
 Archie Lee Smith, B.S., *Instructor in Biochemistry*  
 Donald Franklin Flick, M.S., *Fellow in Biochemistry*  
 Donald McKay, A.B., *Sanders Fellow in Biochemistry*

### 113-14 *Biochemistry*

Roe and Staff

Academic year: lecture (2 hours), conference (1 hour), laboratory (4 hours)—as arranged.

Physiological and clinical chemistry. For medical students.

### 221-22 *Biochemistry* (4-4)

Treadwell

Academic year—Thurs. and Thurs., 9:30 to 12:00 A.M. and 1:00 to 2:00 P.M.

A lecture and laboratory course for premedical students. Prerequisite: Chemistry 22 and 142. Minimal fee, \$15 a semester.

### 224 *Biochemistry of the Enzymes* (1)

Horecker

Spring—Mon., 5:00 P.M.

Lecture course dealing with the biochemistry of the enzymes and enzyme action. Prerequisite: Biochemistry 113 or 221.

### 225-26 *Biochemical Principles* (3-3)

Smith, ———

Academic year—as arranged.

A laboratory course. Minimal fee, \$15 a semester.

### 227-28 *Biochemistry Seminar* (1-1)

Roe

Academic year—Fri., 4:00 P.M.

This course functions in the field of biochemistry, mainly for graduate students, but some of a limited number of specially qualified premed students.

- |         |  |                |
|---------|--|----------------|
| 232     | <i>Proteins and Amino Acids</i> (1)                      | Carroll        |
|         | Spring—Wed., 5:30 P.M.                                   |                |
|         | A lecture course. Prerequisite: Biochemistry 113 or 221. |                |
| 242     | <i>Isotopes</i> (1)                                      | Gray           |
|         | Spring—Sat., 9:00 A.M.                                   |                |
|         | A lecture course. Prerequisite: Biochemistry 113 or 221. |                |
| 251     | <i>Carbohydrate Metabolism</i> (1)                       | Roe            |
|         | Fall—Sat., 9:00 A.M.                                     |                |
|         | A lecture course. Prerequisite: Biochemistry 114 or 222. |                |
| 261     | <i>Biochemistry of the Lipids</i> (1)                    | Treadwell      |
|         | 1937-38 and alternate years.                             |                |
|         | A lecture course. Prerequisite: Biochemistry 114 or 222. |                |
| 295-300 | <i>Research in Biochemistry</i> (var.)                   | Roe, Treadwell |
|         | Alternate year—as arranged.                              |                |
| 299-320 | <i>Thesis</i> (3-5)                                      | Roe, Treadwell |

## DERMATOLOGY AND SYPHILOLOGY

Harry Ford Anderson, M.D., *Professor of Dermatology and Syphilology, Executive Officer*

George William Crosswell, A.B., M.D., *Assistant Clinical Professor of Dermatology and Syphilology*

Hayden Kirby Smith, B.S., M.D., *Assistant Clinical Professor of Dermatology and Syphilology*

James Quincey Gant, Jr., M.S., M.D., *Assistant Clinical Professor of Dermatology and Syphilology*

Theodore Claremont Chen Fong, M.D., *Associate in Dermatology and Syphilology*

Wendell Melvin Willett, A.B., M.D., *Associate in Dermatology and Syphilology*

Reuben Goodman, M.D., *Associate in Dermatology and Syphilology*

### 313 *Dermatology and Syphilology*

The Staff

Full-time hour a week.

Lectures on diseases of the skin and syphilis.

### 317-18 *Clinical*

The Staff

Two weeks a session at intervals during academic year.

Clinical demonstrations, diagnosis, and treatment of skin diseases and syphilis. D. C. General Hospital.

### 497-8 *Clinical*

The Staff

Two hours a week at intervals at intervals during the academic year.

Dermatology and syphilology in infants and children. Children's Hospital.

### 499-100 *Clinical*

The Staff

Two hours a week at intervals at intervals during academic year.

Clinical demonstrations, diagnosis of the skin. University Hospital.



## MEDICINE

- Walter Andrew Bloodorn, A.M., M.D., Sc.D., *Professor of Medicine*  
 Thomas McPherson Brown, A.B., M.D., *Eugene Meyer Professor of Medicine, Executive Officer*  
 Charles Robert Lee Halley, A.B., M.D., *Clinical Professor of Medicine*  
 Clayton Bernard Etheridge, M.D., *Clinical Professor of Medicine*  
 Louis Katz Albert, B.S., M.D., *Clinical Professor of Medicine*  
 Sol Katz, B.S., M.D., *Adjunct Clinical Professor of Medicine*  
 Joseph Francis Fazekas, B.S., M.D., *Adjunct Clinical Professor of Medicine*  
 Harry Eagle, A.B., M.D., *Professional Lecturer in Medicine*  
 Robert William Boellner, B.S., M.D., *Professional Lecturer in Medicine*  
 Henry Field, Jr., B.S., M.D., *Professional Lecturer in Medicine*  
 John Coleman Nunemaker, M.S., M.D., *Professional Lecturer in Medicine*  
 Monroe James Romansky, A.B., M.D., *Associate Professor of Medicine*  
 John McCallum Evans, A.B., M.D., *Associate Professor of Medicine*  
 Peter Demetrius Comandiras, B.S., M.D., M.S. in Med., *Associate Clinical Professor of Medicine*  
 Clarence Richard Hartman, A.B., M.D., *Associate Clinical Professor of Medicine*  
 Walter Kendall Myers, B.S., M.D., *Assistant Clinical Professor of Medicine*  
 John Alton Reed, A.B., M.D., *Assistant Clinical Professor of Medicine*  
 Theodore Judson Abernethy, B.S., M.D., *Assistant Clinical Professor of Medicine*  
 William Travis Gibb, A.B., M.D., *Assistant Clinical Professor of Medicine*  
 Roy Hertz, Ph.D., M.D., *Assistant Clinical Professor of Medicine*  
 Samuel Ross Tanager, M.D., *Assistant Clinical Professor of Medicine*  
 Benjamin Marchant, M.D., *Assistant Clinical Professor of Medicine*  
 Pearl Helly, M.S., M.D., *Assistant Clinical Professor of Medicine*  
 James Joseph Vetter, A.B., M.D., *Assistant Clinical Professor of Medicine*  
 John Watkins Towner, A.B., M.D., *Assistant Clinical Professor of Medicine*  
 Albert David Katin, A.M., M.D., *Assistant Clinical Professor of Medicine*  
 Andrew Gabriel Prandoni, B.S., M.D., *Assistant Clinical Professor of Medicine*

- Ruth Heidler Wilhelmhausen, M.D., *Assistant Clinical Professor of Medicine*
- Ludwig George Lederer, M.D., Ph.D., *Assistant Clinical Professor (Research) of Medicine*
- John Elmer Smith, A.B., M.D., *Assistant Clinical Professor (Research) of Medicine*
- Lawrence Elias Putnam, A.B., M.D., *Assistant Clinical Professor of Medicine*
- Roy Ernest Albert, A.B., M.D., *Assistant Clinical Professor of Medicine*
- Maurice Protas, A.B., M.D., *Associate in Medicine*
- John Minor, A.B., M.D., *Associate in Medicine*
- Lawrence Jay Thomas, B.S., M.D., *Associate in Medicine*
- Bernard Leighton Hardin, Jr., A.B., M.D., *Associate in Medicine*
- Charles William Ordman, A.B., M.D., *Associate in Medicine*
- Benjamin Calloway Jones, Jr., A.B., M.D., *Associate in Medicine*
- Richard Bernard Castell, A.B., M.D., *Associate in Medicine*
- Myer Harold Stolar, B.S., M.D., *Associate in Medicine*
- Sam Thomson Gibson, B.S., M.D., *Associate in Medicine*
- Walter Lewis Nalls, B.S., M.D., *Associate in Medicine*
- Alfred Brasilio, M.D., *Associate in Medicine*
- Halla Brown, M.D., *Associate in Medicine*
- Ralph Bretney Miller, A.B., M.D., *Associate in Medicine*
- Thomas Stone Sammons, A.B., M.D., *Associate in Medicine*
- John Christian Ransome, A.B., M.D., *Associate in Medicine*
- Samuel Jacob Nathan Sauer, Pharm.G., M.D., *Associate in Medicine*
- Joseph Ney, B.S., M.D., *Associate in Medicine*
- Joseph Bernstein, A.B., M.D., *Associate in Medicine*
- Frank Samuelson Bacon, B.S., M.D., *Associate in Medicine*
- Henry Dunlap Fikes, B.S., M.D., *Associate in Medicine*
- Jack Jacob Rhonwald, A.B., M.D., *Associate in Medicine*
- Irene Geraki Taniguchi, M.D., *Associate in Medicine*
- Elizabeth Harrison Hill, M.D., *Associate in Medicine*
- John Bayne Marbury, M.D., *Associate in Medicine*
- Louis Ross, M.D., *Associate in Medicine*
- Frederic Daniel Chapman, A.B., M.D., C.M., *Associate in Medicine*
- John Wilmer Latimer, Jr., M.D., *Associate in Medicine*
- Luther Henry Sooder, A.B., M.D., *Associate in Medicine*
- Charles William Jones, A.B., M.D., *Associate in Medicine*
- Thomas Joseph Pagan, B.S., M.D., *Associate in Medicine*
- Robert Gertrude Taylor, M.D., *Associate in Medicine*
- Charles Waters Thompson, M.D., *Associate in Medicine*
- James Walling Long, M.D., *Associate in Medicine*
- Eugene Schwartz Goldstein, B.S., M.D., *Associate in Medicine*
- Maurice Mensch, M.D., *Associate in Medicine*

- Arthur Rosenbaum, B.S., M.D., *Associate in Medicine*  
 Jarvis Edwin Seegmiller, A.B., M.D., *Associate in Medicine*  
 Iryin Kerlan, B.S., M.D., C.P.H., *Associate in Medicine*  
 Virginia Patterson Beelar, A.B., M.D., *Associate in Medicine*  
 Lester Sylvan Blumenthal, A.B., M.D., M.S. in Med., *Associate in Medicine*  
 Stanley William Kirstein, B.S., M.D., *Associate in Medicine*  
 James Francis Ambury, B.S., M.D., *Associate in Medicine*  
 Robert Norwood Coale, B.S., M.D., *Associate in Medicine*  
 Israel Kessler, M.S., M.D., *Associate in Medicine*  
 Francis James Murray, B.S., M.D., *Associate in Medicine*  
 Edwin Pearson Parker III, B.S., M.D., *Associate in Medicine*  
 Morris Hirsh Rosenberg, A.B., M.D., *Associate in Medicine*  
 John William DuCher, M.D., *Associate in Medicine*  
 Warren Daniel Brill, B.S., M.D., *Associate in Medicine*  
 Marvin Fuchs, B.S., M.D., *Associate in Medicine*  
 William Jack Weaver, Jr., A.B., M.D., *Associate in Medicine*  
 Ruth Boschwitz Benedict, A.B., M.D., *Associate in Medicine*  
 Harold Martin Silver, A.B., M.D., *Associate in Medicine*  
 Jacob Robbins, A.B., M.D., *Associate in Medicine*  
 Thomas James Kennedy, Jr., B.S., M.D., *Associate (Research) in Medicine*  
 Adrian Michael Hogben, M.D., Ph.D., *Associate (Research) in Medicine*  
 Jack Orloff, M.D., *Associate (Research) in Medicine*  
 Ernest Cotlove, B.S., M.D., *Associate (Research) in Medicine*  
 James Irving Boyd, M.D., M.S., *Lecturer in Medicine*  
 Stewart William Bush, B.S., M.D., *Instructor in Medicine*  
 William Robert Folts, Jr., B.S., M.D., *Instructor in Medicine*  
 George Archibald Kelser, Jr., B.S., M.D., *Instructor in Medicine*  
 James Theodore Burns, M.D., *Clinical Instructor in Medicine*  
 Charles Edward Law, M.D., *Clinical Instructor in Medicine*  
 Emil Herbert Bauersfeld, A.B., M.D., *Clinical Instructor in Medicine*  
 William Otis Bailey, Jr., M.D., *Clinical Instructor in Medicine*  
 Harry Clark Bates, B.S., M.D., *Clinical Instructor in Medicine*  
 Jeanne Conle Bateman, A.B., M.D., *Clinical Instructor in Medicine*  
 Thomas Lees Hartman, A.M., M.D., *Clinical Instructor in Medicine*  
 Boris Rabkin, A.B., M.D., *Clinical Instructor in Medicine*  
 Morton Harold Rome, M.D., *Clinical Instructor in Medicine*  
 George Sharpe, A.B., M.D., *Clinical Instructor in Medicine*  
 Cyril Augustus Schumann, B.S., M.D., *Clinical Instructor in Medicine*  
 Louis Aleck Craig, Jr., A.B., M.D., *Clinical Instructor in Medicine*  
 Abraham Wolfe Danish, A.B., M.D., *Clinical Instructor in Medicine*  
 Milton Gussack, A.B., M.D., *Clinical Instructor in Medicine*  
 William Lewis, M.D., *Clinical Instructor in Medicine*



- Alvin Seltzer, B.S., M.D., *Clinical Instructor in Medicine*  
Adolph Friedman, A.B., M.D., *Clinical Instructor in Medicine*  
Samuel Dennis Longbe, A.B., M.D., *Clinical Instructor in Medicine*  
Avin Edward Parrish, M.D., *Clinical Instructor in Medicine*  
Nahum Raphael Sackman, M.D., *Clinical Instructor in Medicine*  
Alfred Barry, A.B., M.D., *Clinical Instructor in Medicine*  
Jack Klich, A.B., M.D., *Clinical Instructor in Medicine*  
Edward Luke Rex, A.B., M.D., *Clinical Instructor in Medicine*  
James Packard Mann, M.D., *Clinical Instructor in Medicine*  
Maurice Arthur Selen, A.B., M.D., *Clinical Instructor in Medicine*  
William Holmes Crosby, Jr., A.B., M.D., *Clinical Instructor in Medicine*  
Joseph Hicks Watson, B.S., M.D., *Clinical Instructor in Medicine*  
Conrad Grosselt, M.D., *Clinical Instructor in Medicine*  
Charles Joseph Savarese, Jr., A.B., M.D., *Clinical Instructor in Medicine*  
James Eliot Chittman, M.D., *Clinical Instructor in Medicine*  
Bernard Robert Congerman, A.B., M.D., *Clinical Instructor in Medicine*  
Marshall Harold Jacobson, A.B., M.D., *Clinical Instructor in Medicine*  
Gottfried Karl Douchak, M.D., *Clinical Instructor in Medicine*  
Norman Hartley Richardson, M.D., *Clinical Instructor in Medicine*  
Leonard Laster, A.B., M.D., *Clinical Instructor in Medicine*  
Howard Otis Mott, A.B., M.D., *Clinical Instructor in Medicine*  
Max Gottle Shorer, M.S., M.D., *Clinical Instructor in Medicine*  
Jesse Leonard Steinfeld, B.S., M.D., *Clinical Instructor in Medicine*  
Donald Morgan Watkins, A.B., M.D., *Clinical Instructor in Medicine*  
Edward Adelson, B.S., M.D., *Clinical Instructor in Medicine*  
Stanton Segal, M.D., *Clinical Instructor in Medicine*  
Gerald John Fisher, A.B., M.D., *Clinical Instructor in Medicine*  
William Leete Stone, A.B., M.D., *Clinical Instructor in Medicine*  
Ted Commons, Jr., B.S., M.D., *Clinical Instructor in Medicine*  
James Bernard Field, M.D., *Clinical Instructor in Medicine*  
Agapomonian Despopoulos, M.D., *Clinical Instructor in Medicine*  
Robert Peadar Heaney, B.S., M.D., *Clinical Instructor in Medicine*  
Bernard Howard Ostrow, A.B., M.D., *Clinical Instructor in Medicine*  
James Charles Morales, A.B., M.D., *Clinical Instructor in Medicine*  
Irene I-Lien Hsu, B.S., M.D., *Clinical Instructor in Medicine*  
Thomas Leonard Gersbach, A.B., M.D., *Clinical Instructor in Medicine*  
Charles David Cooney, A.B., M.D., *Clinical Instructor in Medicine*  
Burtie Nelson, A.B., M.D., *Clinical Instructor in Medicine*  
Robert Reid Belmont, A.B., M.D., *Clinical Instructor in Medicine*  
Dorothy Bertha Chapman, M.D., *Clinical Instructor in Medicine*  
Robert Lynwood Hixson, A.B., M.D., *Clinical Instructor in Medicine*  
Walter Karlund, B.S., M.D., *Clinical Instructor in Medicine*

- Edward Joseph Leonard, M.D., *Clinical Instructor in Medicine*  
 Paul Wesley Yost, B.S., M.D., *Clinical Instructor in Medicine*  
 Margaret Katharina McCabe, M.D., *Fellow in Medicine (Neoplastic Diseases)*  
 Charles William Foalke, A.B., M.D., *Fellow in Medicine (Hematology)*  
 Rogelio Arason, B.S., M.D., *Fellow in Medicine (Gastroenterology)*  
 Benjamin Bateler, M.D., *Fellow in Medicine (Cardiovascular Diseases)*  
 Cesar Augusto Caceres, B.S., M.D., *Fellow in Medicine (Cardiovascular Diseases)*  
 Harold Heathcock Orvis, Jr., B.S., M.D., *Fellow in Medicine (Cardiovascular Diseases)*  
 Athanasios Vasilios Ayranoglou, M.D., *Assistant in Medicine*  
 Thomas Nelson Carter, M.D., *Assistant in Medicine*  
 Julia Causang, M.D., *Assistant in Medicine*  
 David Stanley Davis, A.B., M.D., *Assistant in Medicine*  
 Virginia Duggins, A.M., M.D., *Assistant in Medicine*  
 Robert Francis Dyer, M.D., *Assistant in Medicine*  
 Jerome Harold Epstein, A.M., M.D., *Assistant in Medicine*  
 Richard Crisman Fowler, B.S., M.D., *Assistant in Medicine*  
 Wilfred Ernest Gullinck, M.D., *Assistant in Medicine*  
 John Robert Holmes, A.B., M.D., *Assistant in Medicine*  
 James Chase Kirby, Jr., M.D., *Assistant in Medicine*  
 Edward Malcolm Mason, M.D., *Assistant in Medicine*  
 Edgar Elliot Peltz, M.D., *Assistant in Medicine*  
 Guy Harold Robinson, M.D., *Assistant in Medicine*  
 Jerome Rotstein, A.B., M.D., *Assistant in Medicine*  
 Howard Erwin Tarkin, A.B., M.D., *Assistant in Medicine*

106 *Living Anatomy*

The Staff

Spring—four hours a week.

An introduction to physical diagnosis with special emphasis on topographical anatomy.

230 *Clinical Microscopy*

The Staff

Spring—four hours a week.

Conduction and studies in the clinical application of laboratory examination of blood, body fluids, excretory excreta.

242 *Physical Diagnosis*

The Staff

Spring—four hours a week.

Covers not only theoretical but practical application of principles of physical diagnosis as related to examination of patients.

- 243-44 *Introduction to Medicine* The Staff  
 Academic year—2 hours a week  
 Lectures covering the principles of clinical medical physiology in small groups and readings in the library and laboratory sections.
- 245-46 *Medical Jurisprudence* The Staff  
 Seminars—1 hour a week  
 Lectures on the legal and ethical aspects of medicine, and on the legal problems with which the physician must be faced.
- 325-26 *Clinical Clerkships* The Staff  
 Four weeks at arranged during academic year  
 Training with bed patients under individual supervision designed to develop ability in examination of patients and reasoning as well as practice in clinical diagnosis. D. C. General Hospital.
- 327-28 *Clinical Pathological Conference I* The Staff  
 Academic year—1 hour a week  
 Conferences are held at the School of Medicine. Case histories are presented and discussed by the students and members of the Staff. Clinical, laboratory, and autopsy findings are compared.
- 339-40 *Therapeutics* Staff of Medicine and Pharmacology  
*Conferences I*  
 Academic year—1 hour a week  
 Conferences designed to emphasize the application of pharmacological principles to the problems of clinical medicine. University Hospital.
- 349-53 *Medical Conferences* The Staff  
 Academic year—2 hours a week. D. C. General Hospital.
- 421-22 *Outpatient Clinic I* The Staff  
 Six weeks at arranged during academic year  
 Individual case studies under personal supervision of the Staff. Daily clinics on various medical problems and diseases showing clinical and aspects of disease. Laboratory examinations and instruction in medical specimens. University Hospital.
- 423-24 *Clinical Clerkships* The Staff  
 Six weeks at arranged during academic year  
 University and Mt. Alto Hospitals.



- 427-28 *Clinical Pathological Conference II* The Staff  
 Academic year—1 hour a week  
 Continuation of Medicine 327-28
- 429-30 *Clinical Pathological Conference III* Peery, Halley  
 Academic year—1 hour a week  
 Conferences are held at the University Hospital. Attendance is required of students during their medical clerkships there.
- 431 *Forensic Medicine* The Staff  
 Fall—3 hours a week for four weeks  
 Organized in connection with the University Law School for the purpose of acquainting medical students with their legal responsibilities.

## NEUROLOGY AND NEUROLOGICAL SURGERY

James Winston Watts, B.S., M.D., *Professor of Neurological Surgery, Executive Officer*

Harold Stevens, Ph.D., M.D., *Professor of Neurology*

Seymour Solomon Kety, A.B., M.D., *Professorial Lecturer in Neurology*

Hyman David Shapiro, M.D., *Associate Clinical Professor of Neurology*

Robert Henry Groh, B.S., M.D., *Associate Clinical Professor of Neurology*

Jonathan Marshall Williams, M.D., *Assistant Clinical Professor of Neurological Surgery*

James Peter Murphy, B.S., M.D., *Assistant Clinical Professor of Neurological Surgery*

Hugo Victor Rizzoli, A.B., M.D., *Assistant Clinical Professor of Neurological Surgery*

Anatole Stephen Dekaban, M.D., Ph.D., *Assistant Clinical Professor of Neurology*

Paul Chodoff, A.B., M.D., *Assistant Clinical Professor of Neurology*

George Davis Weiskhardt, M.D., *Associate in Neurology*

Harvey Ammerman, B.S., M.D., *Associate in Neurological Surgery*

George Joseph Hayes, B.S., M.D., Colonel, United States Army, *Associate in Neurological Surgery*

James Francis Hammill, B.S., M.D., *Clinical Instructor in Neurology*

Garrett Swann, M.D., *Clinical Instructor in Neurological Surgery*

Marvin Curtis Korengold, D.D.S., B.S., M.D., *Clinical Instructor in Neurology*

John Thomas Lord, A.B., M.D., C.M., *Clinical Instructor in Neurological Surgery*

Delora Fowler Matt, M.D., *Clinical Instructor in Neurology*

Cosimo Ajmone Marsan, M.D., *Clinical Instructor in Neurology*

Hal Curtis Holland, A.M., M.D., *Fellow in Neuroanatomy*

Ruth Elizabeth Kerr Jacoby, A.B., M.D., *Assistant in Neurological Surgery*

249 *Neurology, Basic Experience*

Stevens, Williams

Follows basic course.

Measures used to study the form and function of the nervous system. Lectures and laboratory demonstrations.

250 *Neurology*

Stevens, Shapiro

Setting—4 hour a week.

Introductory lecture on clinical neurology with specimens, lantern slides, and short papers.

331 *Neurology and Neurological Surgery* Watts, Stevens  
Fall—1 hour a week.

Clinical lectures and demonstrations.

333-34 *Neurology and Neurological Surgery, Clinical Clerkship* Stevens, Williams, Ammerman

In conjunction with 335-36. Two weeks in rotation as arranged during academic year.

Instruction in history, physical examination, ordinary clinical procedures. Attendance at neurological rounds. Six students in rotation. D. C. General Hospital.

335-36 *Neurological Conference* Stevens and Staff

In conjunction with 333-34. Two weeks in rotation as arranged during academic year.

Clinical conference one afternoon a week devoted to study of case studies of specimens from current cases. Six students in rotation. D. C. General Hospital.

431-32 *Neurology and Neurological Surgery Clinic* Shapiro, Ransohoff

Two hours a week for three weeks in rotation as arranged during academic year.

Neurological outpatient clinic. Consultation of staff on ambulatory cases, demonstration of diagnostic procedures, diagnosis of neuro-psychiatric cases, word study. Six students in rotation. University Hospital.

433-34 *Clinical Neurology* Grob

Two hours a week for three weeks in rotation as arranged during academic year.

Neurological outpatient examinations and demonstrations. Six students in rotation. St. Elizabeths Hospital.

435 *Neurological Surgery (elective)* Murphy and Staff

Spring—1 hour a week.

Lectures and motion picture demonstration of neurosurgical problems.



## OBSTETRICS AND GYNECOLOGY

- John Parks, M.S., M.D., *Professor of Obstetrics and Gynecology,  
Executive Officer*
- Henry Landon Darnet, A.B., M.D., *Clinical Professor of Obstetrics  
and Gynecology*
- George Nudlinger, A.B., M.D., *Clinical Professor of Obstetrics and  
Gynecology*
- Robert Henry Batten, B.S., M.D., *Associate Professor of Obstetrics and  
Gynecology*
- Samuel Mayer Dolek, A.M., M.D., *Associate Clinical Professor of  
Obstetrics and Gynecology*
- Jeremiah Keith Cromer, M.D., *Assistant Clinical Professor of Ob-  
stetrics and Gynecology*
- James Albert Dushabek, M.D., *Associate in Obstetrics and Gynecology*
- Clarence Kendall Fraser, Ph.B., M.D., *Associate in Obstetrics and  
Gynecology*
- Barton Winters Richwine, M.D., *Associate in Obstetrics and Gynec-  
ology*
- Floyd Sterling Rogers, M.D., *Associate in Obstetrics and Gynecology*
- Rufus Martin Roll, A.B., M.D., *Associate in Obstetrics and Gynec-  
ology*
- Caroline Jackson, A.M., M.D., *Associate in Obstetrics and Gynecology*
- James Howard Nelson, A.B., M.D., C.M., *Associate in Obstetrics and  
Gynecology*
- James Glover Sites, M.D., *Instructor in Obstetrics and Gynecology*
- Julius Robert Epstein, M.D., *Clinical Instructor in Obstetrics and  
Gynecology*
- Morton Selwyn Kaufman, A.B., M.D., *Clinical Instructor in Obstetrics  
and Gynecology*
- William Thurston Lady, M.D., *Clinical Instructor in Obstetrics and  
Gynecology*
- Jed Williams Pearson, Jr., A.B., M.D., *Clinical Instructor in Obstetrics  
and Gynecology*
- Samuel Hazen Shea, M.D., *Clinical Instructor in Obstetrics and Gynec-  
ology*
- Thomas Miles Leonard, Ph.B., M.D., *Clinical Instructor in Obstetrics  
and Gynecology*
- Albert Seymour Bright, A.B., M.D., *Clinical Instructor in Obstetrics and  
Gynecology*
- Shirley Sue Martin, M.D., *Clinical Instructor in Obstetrics and Gynec-  
ology*

- Neel Jack Price, B.S., M.D., *Clinical Instructor in Obstetrics and Gynecology*
- Roland Laing Bierer, M.D., *Clinical Instructor in Obstetrics and Gynecology*
- Alexander LeSueur Russell, M.D., *Clinical Instructor in Obstetrics and Gynecology*
- Thomas Ashton Wilson, A.B., M.D., *Clinical Instructor in Obstetrics and Gynecology*
- Marvin Peace Footer, A.B., M.D., *Clinical Instructor in Obstetrics and Gynecology*
- Donald Walters, B.S., M.D., *Clinical Instructor in Obstetrics and Gynecology*
- Joseph Marshall Friedman, A.B., M.D., *Clinical Instructor in Obstetrics and Gynecology*
- Leon McNeely Liverett, B.S., M.D., *Clinical Instructor in Obstetrics and Gynecology*
- William Proctor M. Kelway, A.B., M.D., *Clinical Instructor in Obstetrics and Gynecology*
- William Hurlbert Cooper, A.B., M.D., *Clinical Instructor in Obstetrics and Gynecology*
- Peter Soxster, M.D., *Clinical Instructor in Obstetrics and Gynecology*
- Jack Foaly, M.D., *Assistant in Obstetrics and Gynecology*
- Thomas Delos Foster, A.B., M.D., *Assistant in Obstetrics and Gynecology*
- Howard Gurr M. Quarrie, M.D., *Assistant in Obstetrics and Gynecology*
- Terence James Murphy Myles, M.D., Ch.B., B.A.O., *Assistant in Obstetrics and Gynecology*
- John Frederick Patchy, M.D., *Assistant in Obstetrics and Gynecology*
- Irwin Winn Roxner, A.B., M.D., *Assistant in Obstetrics and Gynecology*
- Melvin Wesley Sandmeyer, Jr., A.B., M.D., *Assistant in Obstetrics and Gynecology*
- Nelson Monroe Tart, B.S., M.D., *Assistant in Obstetrics and Gynecology*
- William Davies Wallace, Jr., B.S., M.D., *Assistant in Obstetrics and Gynecology*

## 254 *Introduction to Obstetrics and Gynecology*

Biological—once a week.

Lectures and demonstrations on the development and physiology of the female reproductive system and the management of normal pregnancy.

Dorick, Fraser

301-2 *Midwife Demonstrations*

Foster

One hour a week for eight weeks in rotation as arranged during academic year.

The production of labor and various types of operative delivery demonstrated to students of the junior class. D. C. General Hospital.

312-35 *Gynecology and Gynecology*

The Staff

Academic year—2 hours a week

Lectures and demonstrations on the principles of obstetrics and gynecology.

331-52 *Clinical Clerkship*

The Staff

Five weeks during the academic year in rotation.

Clerkship with patients, including great number, operating room, delivery room, and sickly cases. D. C. General Hospital.

410-40 *Course in Obstetrics and Gynecology* Parks, Butler, Sites

One hour a week for eight weeks in rotation as arranged during academic year.

Student examination and planning of course problems. Demonstrations of diagnosis and treatment in obstetrics and gynecology practice.

441-42 *Clinical Obstetrics*

The Staff

Academic year—44 weeks.

Students participate in general and personal clinical work, observe the nature of labor and deliver patients under supervision, observe and participate in the physiological course and operating rooms of the University and D. C. General Hospitals, attend lectures, departmental meetings and other work done in the University and D. C. General Hospitals.

443-44 *Clinical Gynecology*

The Staff

Five weeks in rotation as arranged during academic year.

Students observe and participate in the gynecological study and operating rooms of the University and D. C. General Hospitals.



## OPHTHALMOLOGY

Ronald Atmore Cox, A.B., M.D., *Professor of Ophthalmology, Executive Officer*

Ernest Alfred Watson Sheppard, M.D., C.M., *Clinical Professor of Ophthalmology*

Richard Wallace Wilkinson, A.B., M.D., M.S. in Med., *Assistant Clinical Professor of Ophthalmology*

Carmon Robert Naples, B.S., M.D., *Associate in Ophthalmology*

Walter Joseph Romeiko, M.D., *Associate in Ophthalmology*

William Paxson Chalfant, Jr., M.D., *Associate in Ophthalmology*

William Joseph Graham Davis, A.B., M.D., *Associate in Ophthalmology*

Robert Edward duPrey, B.S., M.D., *Associate in Ophthalmology*

Robert Day, A.B., M.D., *Associate in Ophthalmology*

Melvin Gustavus Alper, A.B., M.D., *Clinical Instructor in Ophthalmology*

Oscar Lavine, M.D., *Clinical Instructor in Ophthalmology*

### 352 *Ophthalmology*

The Staff

Spring—one hour a week for sixteen weeks as arranged

Lecture course presenting aspects of all the principles of ophthalmology.

### 447 *Clinic*

The Staff

Fall—as arranged

During medical out-patient service, each student is given individual instruction in the ophthalmological aspects of systemic disease. (University Hospital)

## OTOLARYNGOLOGY

- Arthur David Fischer, M.D., *Associate Clinical Professor of Otolaryngology*  
 James Jerry McFarland, Jr., B.S., M.D., *Assistant Clinical Professor of Otolaryngology, Executive Officer*  
 Catherine Birch, A.B., M.D., *Associate in Otolaryngology*  
 Jack Louis Levine, M.D., *Associate in Otolaryngology*  
 Morris Edward Krimoff, B.S., M.D., *Associate in Otolaryngology*  
 Russel Smith Page, Jr., A.B., M.D., *Clinical Instructor in Otolaryngology*  
 Willard Beecher Walters, B.S., M.D., *Clinical Instructor in Otolaryngology*  
 Harry Ward McCurdy, A.B., M.D., *Clinical Instructor in Otolaryngology*  
 Joseph Aziz Sabri, A.B., M.D., *Clinical Instructor in Otolaryngology*  
 William MacLohan Triple, A.B., M.D., *Clinical Instructor in Otolaryngology*

### 351 *Otolaryngology*

The Staff

Three hours a week for thirteen weeks.

Lectures and demonstrations on anatomy, physiology, and diseases of the ear, nose, and throat.

### 354 *Bronchology*

The Staff

Three hours a week for two weeks.

A review of lectures on the fundamental principles and the use of instruments, including bronchoscopy and endoscopy.

### 355-56. *Clinical*

The Staff

One and one-half hours a week in rotation as arranged during summer year.

Practical clinical instruction in the diagnosis and treatment of diseases of the ear, nose, and throat. D. C. General Hospital.

## PATHOLOGY

Thomas Martin Peery, A.B., M.D., *Professor of Pathology, Executive Officer*

Daniel Leigh Weiss, A.B., M.D., *Adjunct Clinical Professor of Pathology*

Frank Nelson Miller, B.S., M.D., *Associate Professor of Pathology*

William Newman, A.B., M.D., *Assistant Professor of Pathology*

William Laverne Marsh, B.S., M.D., *Assistant Professor of Pathology*

Lois Irene Platt, A.B., M.D., *Clinical Instructor in Pathology*

### SPECIAL STAFF FOR DEMONSTRATIONS

John Stewart Howe, A.B., M.D., *Assistant Clinical Professor of Pathology*

Erving Francis Geever, M.D., Ph.D., *Assistant Clinical Professor of Pathology*

Lorenz Eugene Zimmerman, A.B., M.D., *Associate in Pathology*

Raymond Georges Gottschalk, B.S., M.D., *Associate in Pathology*

Franklin Martin, Jr., A.B., M.D., C.M., M.S. in Neurol., *Associate in Pathology*

Richard Emery Palmer, A.B., M.D., *Associate in Pathology*

William Francis Eads, A.B., M.D., *Clinical Instructor in Pathology*

Lester Walter Fix, M.D., *Clinical Instructor in Pathology*

Edward Matthew Rehak, B.S., M.D., *Clinical Instructor in Pathology*

### SPECIAL LECTURERS

Elson Bowman Helwig, B.S., M.D., *Assistant Chief, Pathology Division  
Armed Forces Institute of Pathology*

Lent Clifton Johnson, B.S., M.D., *Pathologist, Armed Forces Institute  
of Pathology*

259-60 Pathology

Peery, Miller

Fall—9 hours a week, spring—3 hours a week

General pathology of infectious diseases, degenerative, neoplastic, and systemic. Special pathology of the organs and systems. The laboratory work consists of the gross and microscopic study of diseased tissue. Special emphasis is placed on the close relationship of the various pathological changes and their correlation with symptoms and physical signs.



- 261-62 *Necropsy* The Staff  
Academic year—as arranged  
Students are required to attend and assist in the performance of necropsies at the University Hospital.
- 263-64 *Demonstrations in Pathology* Special Staff  
Academic year—1 hour a week  
Gross specimens of representative cases from various hospitals are demonstrated and discussed.
- 267-68 *Seminars in Pathology (elective)* Special Lecturers  
Academic year—as arranged  
Advanced lectures are presented as arranged on special topics in pathology.
- 320 *Medical Jurisprudence* Miller  
Spring—1 hour a week.  
Forensic pathology and testimony. The legal and ethical rights and responsibilities of physicians. Legal problems in medicine.
- 323-24 *Surgical Pathology* Weiss  
Academic year—1 hour a week  
Weekly conferences are held with the student group assigned to the surgical clerkship, reviewing gross and microscopical specimens.
- 327-28 *Clinical Pathological Conference I* The Staff  
Academic year—1 hour a week  
Conferences are held at the School of Medicine. Case histories are presented and discussed by the students and members of the staff. Clinical, laboratory, and necropsy findings are compared.
- 327-28 *Clinical Pathological Conference II* The Staff  
Academic year—1 hour a week  
Continuation of Pathology 327-28.
- 429-30 *Clinical Pathological Conference III* The Staff  
Academic year—1 hour a week  
Conferences are held at the University Hospital. Attendance is required of students doing the medical clerkship there.
- 492 *Surgical Pathology* Newman  
Spring—1 hour a week.  
A systematic study of the gross and microscopic changes in the organs and tissues commonly removed surgically.

**493-94 Pathology Clerkship (elective) Peery, Miller, Newman**  
Academic year—as arranged

A limited number of students receive training in medical pathology and necropsies in the laboratory at the University Hospital.

## PEDIATRICS

- Preston Alexander McLendon, B.S., M.D., *Professor of Pediatrics, Executive Officer*
- Margaret Mary Nicholson, A.B., M.D., *Clinical Professor of Pediatrics*
- Edward Lewis, M.D., *Clinical Professor of Pediatrics*
- William Staton Anderson, A.B., M.D., *Clinical Professor of Pediatrics*
- Leroy Edward Hoeck, M.D., *Adjunct Clinical Professor of Pediatrics*
- John Augustine Washington, B.S., M.D., *Associate Clinical Professor of Pediatrics*
- Reginald Spencer Lourie, B.S., M.D., Med. Sc.D., *Associate Clinical Professor of Pediatric Psychiatry*
- Joseph Michael LoPresti, B.S., M.D., *Assistant Professor of Pediatrics*
- Mabel Harlakenden Grosvenor, A.B., M.D., *Assistant Clinical Professor of Pediatrics*
- Aaron Nimetz, A.B., M.D., *Assistant Clinical Professor of Pediatrics*
- George Maksim, M.D., M.S. in Ped., *Assistant Clinical Professor of Pediatrics*
- William Allen Howard, A.B., M.D., *Assistant Clinical Professor of Pediatrics*
- John Howell Peacock, B.S., M.D., *Associate in Pediatrics*
- Maynard Irving Cohen, A.B., M.D., *Associate in Pediatrics*
- Mary Katherine Laurence Sartwell, A.B., M.D., *Associate in Pediatrics*
- Allan Bertram Coleman, M.D., *Associate in Pediatrics*
- Charles Frederick Stiegler, A.B., M.D., *Associate in Pediatrics*
- Hugh Gambel Clark, A.B., M.D., *Associate in Pediatrics*
- Adrian Reinos, Jr., B.S., M.D., *Associate in Pediatrics*
- Robert Edward Martin, M.D., *Associate in Pediatrics*
- Charles Richard Webb, B.S., M.D., *Associate in Pediatrics*
- William Stark, A.B., M.D., *Associate in Pediatric Psychiatry*
- Margaret Frances Gutelius, A.B., M.D., *Associate in Pediatrics*
- Aschwald Rich MacPherson, A.B., M.D., *Associate in Pediatrics*
- Herbert Harold Diamond, M.D., *Clinical Instructor in Pediatrics*
- Reginald Henry Mitchell, M.D., *Clinical Instructor in Pediatrics*
- Robert Orr Warthen, M.D., *Clinical Instructor in Pediatrics*
- Emilie Annabelle Black, B.S., M.D., *Clinical Instructor in Pediatrics*
- Robert Harper Anderson, M.D., *Clinical Instructor in Pediatrics*
- Warren Godfrey Preisser, A.B., M.D., *Clinical Instructor in Pediatrics*
- Sanford Leon Leiken, M.D., *Clinical Instructor in Pediatrics*
- Bennett Olshaker, A.B., M.D., *Clinical Instructor in Pediatric Psychiatry*



Harold Taylor Yates, B.S., M.D., *Clinical Instructor in Pediatrics*  
 Roger Bergstrom, M.D., *Clinical Instructor in Pediatrics*  
 George Joel Cohen, M.D., *Clinical Instructor in Pediatrics*

## SPECIAL LECTURER

Myron Ezra Wegman, A.B., M.D., M.P.H., *Director, Division of Education and Training, Pan American Sanitary Bureau, Regional Office for the Americas of World Health Organization; Pediatrics*

256 *Pediatrics*

McLendon and Staff

Spring—2 hours a week

Lectures on physiology of the newborn, development, infant nutrition, diseases of the newborn, common diseases and system diseases of infancy and childhood. Medical School

357-58 *Clinical Clerkship—General Pediatrics*

LoPresti and Staff

Two weeks as arranged during academic year

Introduction to clinical pediatrics. Emphasis on bedside discussion and group teaching including the residents. Ward rounds. Five students in rotation. D. C. General Hospital

359-60 *Clinical Clerkship—Contagious Diseases*

LoPresti and Staff

Two weeks as arranged during academic year

Continuation and bedside instruction in contagious and infectious diseases. Prevention and diagnostic measures. Five students in rotation. D. C. General Hospital

361-62 *Clinical Clerkship I*

McLendon and Staff

Academic year—1 hour a week

Required. Presentation and discussion by students of current patient problems. D. C. General Hospital

363-64 *Ward Rounds*

Nurdam, LoPresti, and Staff

Academic year—as arranged

Bi-weekly ward rounds with students and Resident Staff. D. C. General Hospital

365-66 *Psychiatry*

Lewie and Staff

Academic year—as arranged

Lectures on normal behavior and emotional development. Clinical case analysis. Second, third, and fourth years

457-58 *Clinical Clerkship*

Armstrong and Staff

Six weeks as arranged during academic year.

Full time, including assignment to night and holiday admissions. Case studies on weeks under direct Resident supervision. Work closely with staff and Residents. Twelve students. Children's Hospital.

459-60 *Outpatient Clinic*

Gonzales and Staff

Academic year—of around.

Work in Medical and Surgery rooms including surgery, surgery, X-ray, chest x-ray, pediatrics, dermatology, obstetrics and gynecology. Children's Hospital.

401-02 *Clinical Pathological Conference*

The Staff

Academic year—1 hour a week.

Clinical and pathological discussion of recent patient history and laboratory data. Children's Hospital.

403-04 *Section Conferences*

The Staff

Academic year—twice a week.

Discussion of clinical problems of diagnosis and treatment of current patients. Children's Hospital.

405-06 *Section Conferences*

The Staff

Academic year—1 hour a week.

Surgical diagnosis, pre and postoperative management. Children's Hospital.

407-08 *Clinical Conference II*

McLendon and Staff

Academic year—1 hour a week.

Roundtable. Case presented by students. Staff and student discussion of diagnosis and management. Medical School.

409-10 *Child Guidance and Development*

Lottie

Academic year—of around.

Lectures to second year class. Clinical in fourth year involving Well-Baby Clinic. Group and class conferences.

## PHARMACOLOGY

Paul Kenneth Smith, Ph.D., *Professor of Pharmacology, Executive Officer*

Ralph Grafton Smith, M.D., Ph.D., *Clinical Professor of Pharmacology*

Bernard Beryl Brodie, Ph.D., *Professorial Lecturer in Pharmacology*

Harold George Mandel, Ph.D., *Associate Professor of Pharmacology*

Clarke Davison, Ph.D., *Assistant Professor of Pharmacology*

Elise Ann Brandenburger Brown, Ph.D., *Assistant Professor of Pharmacology*

Moreshwar Vithal Nadkarni, Ph.D., *Assistant Research Professor of Pharmacology*

Eberhard Georg Trams, Ph.D., *Assistant Research Professor of Pharmacology*

Nicholas Michael Cambosos, M.S., *Research Fellow in Pharmacology*

Ariel Cahill Hollinshead, A.M., *Research Fellow in Chemotherapy*

Arthur Michaelson, M.S., *Teaching Fellow in Pharmacology*

### SPECIAL LECTURER IN PHARMACOLOGY

William Vincent Crahan Leach, Ph.D., *Assistant Chief, Radioisotope Service, Veterans Administration Hospital, Washington, D. C.*

#### 201 Pharmacology (5)

The Staff

Fellows—5 hours a week

Lectures and discussions concerning the pharmacology of general anesthetic agents, tranquilizers, sedatives, hypnotics, and other central nervous system drugs.

#### 202 Chemotherapy (1)

The Staff

Students—1 hour a week

Continuation of Pharmacology 201

#### 203 Pharmacology Laboratory (1)

The Staff

Fellows—1 hour a week

Laboratory exercises and discussions dealing with general Pharmacology 201. Open to qualified medical students.

#### 407-408 Pharmacological Research (var.)

The Staff

Advanced research course

Students are given primary method problems and research projects related to pharmacology.



- 269-70 *Pharmacology Seminar* (1-1) The Staff  
Academic year—2 hours a week  
Recent advances in pharmacology. For those interested in pharmacological research. Open to qualified nonmedical students.
- 279-80 *Special Methods in Research* (211.) The Staff  
Academic year—as arranged  
A course to familiarize the student with advanced histological, physiological, and pharmacological methods employed in pharmacological investigations. Open to qualified nonmedical students.
- 291-300 *Thesis* (3-3) The Staff  
Academic year—as arranged  
Required of Master of Arts and Master of Science candidates.
- 319-40 *Therapeutics* Staff of Pharmacology and Medicine  
*Conferences I*  
Academic year—1 hour a week  
Conferences designed to emphasize the application of pharmacological principles to the problems of clinical medicine.

## PHYSICAL MEDICINE AND REHABILITATION

- Charles Samuel Wise, B.S., M.D., *Professor of Physical Medicine and Rehabilitation, Executive Officer*  
 Francis Liell Wenger, B.S., M.D., *Assistant Clinical Professor of Physical Medicine and Rehabilitation*  
 Alvin Knudson, B.S., M.D., *Associate in Physical Medicine and Rehabilitation*  
 Charles Jerome Everding, B.S., M.D., *Clinical Instructor in Physical Medicine and Rehabilitation*  
 John Watt, Jr., B.S., M.D., *Fellow in Physical Medicine and Rehabilitation*  
 Jessie Elizabeth Fair, M.C.S.P., R.P.T., *Assistant in Physical Medicine and Rehabilitation*  
 Helen Eileen Weber, B.S., R.P.T., R.N., *Assistant in Physical Medicine and Rehabilitation*

### 150 *Elements of Physical Medicine*

The Staff

Spring—as arranged.

In arrangement with the Anatomy Department, lectures and demonstrations of the various tests and measurements are employed in the evaluation of physical disability.

### 451-52 *Advanced Physical Medicine*

The Staff

Academic year—as arranged.

Lectures and demonstrations concerning the various techniques, clinical applications of physical medicine and rehabilitation to be integrated with the teaching of the associated medical and surgical conditions.

### 457-58 *Clinical Studies*

The Staff

Academic year—as arranged.

Clinical teaching and demonstration at the University Hospital.

### 485 *Research* (arr.)

The Staff

Fall—as arranged.

Open to medical students and qualified nonmedical students.

## PHYSIOLOGY

Charles Elwood Leese, Ph.D., *Prof. Professor of Physiology, Executive Officer*

William Rankin Dwyer, Ph.D., *Research Professor of Physiology*

Joseph William Still, M.D., M.P.H., *Assistant Professor of Physiology*

Habeeb Baechus, Ph.D., M.D., *Assistant Research Professor of Physiology*

Melvin Harold Heffner, Ph.D., *Assistant Research Professor of Physiology*

Wallace Lane Chan, A.B., M.D., *Assistant Research Professor of Physiology*

Hyman Erwin Steinmann, M.D., *Lecturer in Physiology*

Louis Pat Munan, M.S., *Associate in Physiology*

Charles Arthur Toompas, A.M., *Instructor in Physiology*

Tal Gordon Hiebert, A.M., *Instructor in Physiology*

Francis DeSales Woldich, B.S., M.D., *Associate (Research) in Physiology*

Agnes Burticks, M.D., *Fellow in Physiology*

### 115 *Physiology* (3)

Leese, Still, Toompas

Fall—Section A—Tues. and Thurs., 8:45 to 10:00 A.M.; section B—Tues. and Thurs., 5:15 to 7:25 P.M.

Lectures for premedical students covering the fundamentals of physiology in its various subdivisions. Prerequisite: one year of general science or one semester of a biological science.

### 117 *Experimental Physiology* (1)

Toompas

Fall—Sec., 9:15 to 12:00 A.M.

Laboratory exercises in the fundamentals of physiology for medical and students. Prerequisite: no equivalent registration. Physiology 115 or the equivalent. *Mineralogy*, 515.

### 120 *Physiology of Endocrine Glands* (2)

Munan

Spring—Tues. and Thurs., 6:45 P.M.

For premedical students. The endocrine, metabolic, reproductive growth and other systems, hormones and their tests, anatomy and physiology of endocrine glands. Prerequisite: Physiology 115 or the equivalent.

### 130 *The Psycho-physiology of Personality* (2)

Leese

Spring—Tues. and Thurs., 5:15 P.M.

For premedical students. Lectures on the genesis and expression of personality, with emphasis on the physiological approach. Prerequisite: Physiology 115 or the equivalent and general psychology.



140-5 *Advanced Physiology*

Lecure and Staff

Fall—4 hours a week; spring—14 hours a week.

Lectures and laboratory work in all divisions of Physiology. The course is designed for medical students.

201-2 *Experimental Method* (1-1)

First half: fall and winter—Sat., 2:00 A.M. Second half: spring—Sat., 9:00 A.M.

For premedical graduate students. Design of controlled experiments in medical or biological investigations, errors in design, criticism and judgment of evidence, and tests of the statistical significance of experimental results.

211-12 *Problems in Physiology* (arr.)

The Staff

Academic year—as arranged.

For premedical graduate students. Open to undergraduate students with the approval of the Department. Prerequisite: Physiology 115 and 117, or the equivalent.

221-22 *Physiology Seminar* (1-1)

The Staff

Academic year—1 hour a week, as arranged.

For premedical students undertaking reading work in physiology. Prerequisite: Physiology 115 and 117, or the equivalent.

231 *Advanced Physiology of Circulation and Respiration* (4)

Lecure, Thompson, and Staff

Fall—4 hours a week, as arranged.

For premedical graduate students. Lectures on blood, heart, circulation, tissue-water, respiration, and related functions.

234 *Advanced Physiology of Nutrition, Metabolism, Excretion* (2)

Lecure, Still, Seaman

Spring—2 hours a week, as arranged.

For premedical graduate students. Lectures on nutrition, digestion, metabolism, excretion, and temperature regulation.

236 *Advanced Physiology of the Endocrine Glands and Reproduction* (2)

Bogden, Still

Spring—1 hour a week, as arranged.

For premedical graduate students. Lectures on digestive glands, the thyroid, adrenal glands, and reproduction.

- 235 *Advanced Physiology of the Neuro-muscular System* (2) Lewis, Thompson

Section—2 hours a week, as arranged.

For anatomical graduate students. Lectures on sensory, respiratory, central nervous system, arterial and venous motor activity, and the function of smooth and striated muscle.

- 240 *Advanced Experimental Physiology* Thompson and Staff (3)

Section—2 hours a week, as arranged.

For anatomical graduate students. Laboratory work with control over the lecture in course 231-232. Manual fee, \$42.

- 245 *Advanced Physiology of the Cell* (1) Daritye

Section—2 hours a week, as arranged.

For anatomical graduate students. Special emphasis on Myofibrils and the function of the cell in relation to organ function.

- 255-260 *Research (Art.)* Lewis and Staff

Arbitrarily given—2 hours a week

- 295-300 *Teach (3-5)* Reese

## PSYCHIATRY

- Winfred Overholser, A.B., M.D., Sc.D., L.H.D., *Professor of Psychiatry, Executive Officer*  
 Addison M. Gatte Duval, M.D., *Clinical Professor of Psychiatry*  
 Leon Yochelson, A.B., M.D., *Clinical Professor of Psychiatry*  
 Henry Prather Laughlin, B.S., M.D., *Associate Clinical Professor of Psychiatry*  
 Marshall deGraffenried Roth, B.S., M.D., *Associate Clinical Professor of Psychiatry*  
 Sidney Berman, B.S., M.D., *Assistant Clinical Professor of Psychiatry*  
 Morris Kleinerman, Ch.D., M.B., *Assistant Clinical Professor of Psychiatry*  
 Jay Louis Hoffman, A.B., M.D., *Assistant Clinical Professor of Psychiatry*  
 Elmer Klein, B.S., M.D., *Assistant Clinical Professor of Psychiatry*  
 Anna Coyne Todd, A.B., M.D., *Assistant Clinical Professor of Psychiatry*  
 Norman Taub, B.S., M.D., *Assistant Clinical Professor of Psychiatry*  
 Harold Corson, M.D., *Assistant Clinical Professor of Psychiatry*  
 Anna Genevieve McEldowney, A.B., M.D., *Associate in Psychiatry*  
 Sarah Shtoffler Tenenblatt, A.B., M.D., *Associate in Psychiatry*  
 David Eden, A.B., M.D., *Associate in Psychiatry*  
 Robert Milton Greenberg, A.B., M.D., *Associate in Psychiatry*  
 Helen Pallister, Ph.D., *Clinical Instructor in Psychiatry (Psychology)*  
 Richard Allan Rogers, B.S., M.D., *Clinical Instructor in Psychiatry*  
 Richard Graham Bowd, B.S., M.D., *Clinical Instructor in Psychiatry*  
 John Anthony Farrell, M.D., *Clinical Instructor in Psychiatry*  
 William Deaver Kaine, A.B., M.D., *Clinical Instructor in Psychiatry*  
 Herman Arnold Meyersburg, B.S., M.D., *Clinical Instructor in Psychiatry*  
 Samuel Chrobolowski Gordon, M.D., *Clinical Instructor in Psychiatry*  
 Harold Bernard Lehrman, A.B., M.D., *Clinical Instructor in Psychiatry*

### 165 *Dynamics of Personality Development*

Reynolds

Fall—1 hour a week

An orientation course in the emotional, physiological, and psychological growth and development of personality. Consideration of characteristics of structure, function, and development of the psyche leading to normal behavior as a basis for the study of the pathological. Evaluation of contemporary relationships.



178 *Psychopathology*

Huffman

Spring—1 hour a week

Manifestations and understanding of various mental mechanisms and abnormal reactions, provided by history of development of psychopathology and illustrated with case material.

260 *Psychiatry*

Overholser

Spring—1 hour a week.

History, etiology, symptoms, course, and treatment of the major psychoses with emphasis on the diagnosis involving the person as a whole.

268 *Demonstration Clinics*

McElwainey, Tenenblatt

Spring—1 hour a week.

Presentation of clinical cases of major mental illnesses and primary behavior disturbances, correlating with Psychiatry 260. Daily student examines patients under supervision. St. Elizabeths and D. C. General hospitals.

272 *Psychosomatic Aspects of General Medicine*

Rosen

Spring—1 hour a week.

Somatic disorders of psychogenic origin. The role of personality reactions in functional and organic disorders.

324 *Psychoneurosis*

Laughlin

Spring—1 hour a week

Etymology, psychopathology, clinical aspects, and treatment of various types of psychoneuroses. Medical Conference Room, D. C. General Hospital.

431-32 *Clinical*

Dowal, Nychelson, Taub, Cerson, Pallister.

*Clerkship*Eden, Greenberg, Rogers, Board, Farrell,  
Kehne, Meyersburg

Three weeks divided service as arranged during academic year.

Supervised examination, diagnosis, and treatment of ambulatory borderline cases in University Hospital and hospitalized cases in St. Elizabeths Hospital. Conference for discussion of cases. Clinical application of psychiatric principles to general medical practice is stressed. University Hospital Inpatient and Outpatient Psychiatry (Index and St. Elizabeths Hospital).

## RADIOLOGY

- William Woodrow Stanbro, M.D., *Professor of Radiology, Executive Officer*  
 Solomon Rodney Bersack, B.S., M.D., *Assistant Clinical Professor of Radiology*  
 Charlotte Patricia Donlon, A.B., M.D., *Assistant Clinical Professor of Radiology*  
 Harry Jay Kehler, M.D., *Assistant Clinical Professor of Radiology*  
 Alvin Charles Wyman, A.B., M.D., *Associate in Radiology*  
 Herman Litwer, M.D., *Associate in Radiology*  
 George Tseyky, M.D., *Clinical Instructor in Radiology*  
 Uthai Vincent Wilcox II, M.D., *Clinical Instructor in Radiology*  
 Nan Popovic Van Wagoner, B.S., M.D., *Clinical Instructor in Radiology*  
 Charles Malcolm Weber, M.D., *Clinical Instructor in Radiology*

- |         |   |           |
|---------|---|-----------|
| 115-116 | <i>Immunology</i><br>Academic program arranged<br>Coordination of oral and Reading essays                                       | The Staff |
| 120     | <i>Principles of Radiology</i><br>Spring—on arranged<br>Lectures and discussions  | The Staff |
| 133     | <i>Advanced Radiological Diagnosis</i><br>Fall—on arranged<br>Lectures and discussions  | The Staff |
| 443-444 | <i>Clinical Studies</i><br>Students are assigned to the X-ray Department in rotation on a full-time basis for a specific period | The Staff |

## SURGERY

- Brian Blades, A.B., M.D., *Professor of Surgery, Executive Officer*  
 Arch Lockhart Riddick, B.S., M.D., *Clinical Professor of Surgery*  
 John Gordon Lee, A.B., M.D., C.M., Med. Sc.D., *Adjunct Clinical Professor of Surgery*  
 Robert Turbill Gault, B.S., M.D., *Adjunct Clinical Professor of Surgery*  
 Herbert Hermann Schoenfeld, M.D., *Associate Clinical Professor of Surgery*  
 Alce Hower, M.S., M.D., *Associate Clinical Professor of Surgery*  
 William Stanley McCune, A.B., M.D., *Associate Clinical Professor of Surgery*  
 Walter Henry Gerwie, Jr., A.B., M.D., *Associate Clinical Professor of Surgery*  
 Vincent Michael Levine, B.S., M.D., *Associate Clinical Professor of Surgery*  
 Owen Gwathmey, A.B., M.D., *Assistant Professor of Surgery*  
 Roscoe Franklin Dean, Jr., M.S., M.D., *Assistant Clinical Professor of Surgery*  
 Carl Ross, M.D., *Assistant Clinical Professor of Orthopedic Surgery*  
 Calvin Tiesler Kline, A.B., M.D., *Assistant Clinical Professor of Surgery*  
 John Salmon Norquist, A.B., M.D., *Assistant Clinical Professor of Orthopedic Surgery*  
 Eugene Bruce Hatwell, M.D., *Assistant Clinical Professor of Surgery*  
 Leonard Thomson Parsons, B.S., M.D., *Assistant Clinical Professor of Orthopedic Surgery*  
 Leon Plush Adams, B.S., M.D., *Assistant Clinical Professor of Orthopedic Surgery*  
 Charles Sparks Lammiman, B.S., M.D., *Assistant Clinical Professor of Surgery*  
 Robert Robert Thompson, D.D.S., *Associate in Dental Surgery*  
 William Paul Mirels, M.D., *Associate in Surgery*  
 Louis Joseph Weinman, B.S., Ph.D., M.D., *Associate in Surgery*  
 William Cyrus Meloy, M.D., M.S. in Med., *Associate in Surgery*  
 Edward Alexander Cafare, M.D., *Associate in Surgery*  
 Earl Haydon Wood, Ph.D., D.D.S., *Associate in Dental Surgery*  
 Isadore Harrison, A.B., M.D., *Associate in Surgery*  
 Henry Louis Feffer, A.B., M.D., *Associate in Orthopedic Surgery*  
 Harold Cresseth Poirson, A.B., M.D., *Associate in Surgery*  
 James Richard Threlkeld, B.S., M.D., *Associate in Surgery*  
 Paul Charles Atkins, A.B., M.D., *Associate in Surgery*



George Jerome Magovern, M.D., *Instructor in Surgery*  
 Crenshaw Douglas Briggs, B.S., M.D., *Clinical Instructor in Surgery*  
 Joseph Francis Conlon, D.D.S., *Clinical Instructor in Dental Surgery*  
 Duane Case Richtmeyer, A.B., M.D., *Clinical Instructor in Surgery*  
 Leon Gerber, M.D., *Clinical Instructor in Surgery*  
 Thomas Bradley, A.B., M.D., *Clinical Instructor in Surgery*  
 Ernest Alva Gould, B.S., M.D., *Clinical Instructor in Surgery*  
 Austin Bertram Rohrbaugh, Jr., M.D., *Clinical Instructor in Orthopedic Surgery*

Marvin Hayne Kendrick, A.B., M.D., *Clinical Instructor in Surgery*  
 Brooks Gideon Brown, B.S., M.D., *Clinical Instructor in Surgery*  
 John Decator Hoyle, B.S., M.D., *Clinical Instructor in Surgery*  
 Robert Roland Smith, B.S., M.D., *Clinical Instructor in Surgery*  
 Norman Harry Isaacson, A.B., M.D., *Clinical Instructor in Surgery*  
 Charles Stanley White, Jr., B.S., M.D., *Clinical Instructor in Surgery*  
 Dennis Parfremment McCarty, M.D., *Clinical Instructor in Surgery*  
 John Mark Keshishian, M.D., *Clinical Instructor in Surgery*  
 Maxine Ann Schurter, A.B., M.D., *Clinical Instructor in Surgery*  
 Stanley Baker, Jr., B.S., M.D., *Assistant in Surgery*  
 Edward Eugene Cornwell, Jr., B.S., M.D., *Assistant in Surgery*  
 James Arthur Dantord, B.S., M.D., *Assistant in Surgery*  
 Emmett Russell Hall, Jr., M.D., *Assistant in Surgery*  
 Richard Keslar Harkcom, B.S., M.D., *Assistant in Surgery*  
 Stephen Bartolf Hiltabiddle, A.B., M.D., *Assistant in Surgery*  
 Robert Carney Luckey, A.B., M.D., *Assistant in Surgery*  
 Barber Clayton Palmer, Jr., A.B., M.D., *Assistant in Surgery*  
 Gerrit Peereboom, M.D., *Assistant in Surgery*  
 Louis Robert Perna, A.B., M.D., *Assistant in Surgery*  
 Robert Peter Riker, B.S., M.D., *Assistant in Surgery*  
 Jacob Rosensweig, B.S., M.D., C.M., *Assistant in Surgery*  
 Daniel Lamont Seckinger, Jr., A.B., M.D., *Assistant in Surgery*  
 William Albert Spencer, A.B., M.D., *Assistant in Surgery*  
 Ernest Howard Teagle, A.B., M.D., *Assistant in Surgery*

#### 401-2 *Surgical Anatomy*

*Surgery and Anatomy Staffs*

Academic year—1 hour alternate weeks, as arranged

Clinics illustrating relationship between gross anatomy and clinical surgery. University Hospital.

#### 280 *Introduction to Surgery*

*The Staff*

Spring—1 hour a week.

Lectures and recitations covering the field of general surgery.

- 284 *Surgical Physiology* The Staff  
 Spring—two hours a week  
 A clinical and laboratory course with particular emphasis on applied physiology.
- 373-74 *Clinical Clerkship I* The Staff  
 Academic year—as arranged  
 The student is assigned and required to work up thoroughly the cases for diagnosis and treatment. D. C. General Hospital.
- 375-76 *Outpatient Surgical Clinic* The Staff  
 Forty hours as arranged during academic year  
 Surgical clinic. D. C. General Hospital.
- 377-78 *Orthopedics I* The Staff  
 Academic year—lecture—1 hour a week, ward rounds—7½ hours a week, in rotation.  
 D. C. General Hospital.
- 379-80 *Surgical Staff Conference I* The Staff  
 Academic year—Tuesday as arranged.  
 D. C. General Hospital.
- 383-84 *Surgical Clinic I* Blades  
 Academic year—1 hour a week  
 Demonstration of various surgical diseases to the entire class. University Hospital.
- 473-74 *Clinical Clerkship II* The Staff  
 Academic year—in rotation  
 Six weeks, University Hospital; three weeks, Mt. Alto Hospital.
- 479-80 *Surgical Staff Conference II* The Staff  
 Academic year—Wednesday as arranged.  
 University Hospital.
- 483-84 *Surgical Ward Rounds* Blades  
 Academic year—1 hour a week  
 Demonstration of various surgical diseases to fourth-year clerks. University Hospital.
- 491-92 *Surgical Pathology II* Newman  
 Academic year—conference—1 hour a week.

493-94 *Surgical Anatomy*

Horwitz and Staff

Advanced year: 4 hours a week for twelve weeks in rotation

Lectures for fourth-year M.D. University Hospital

497-98 *Surgical Clinic*

Gants and Staff

Advanced year: 2 hours a week

Concentrated at Walter Reed Hospital for fourth-year clerkship assigned to the University Hospital



## UROLOGY

Frederick A. Reuter, M.D., *Professor of Urology, Executive Officer*  
 Thomas Carlton Thompson, B.S., M.D., *Clinical Professor of Urology*  
 Edward Egner Ferguson, M.D., *Assistant Clinical Professor of Urology*  
 Leon Richard Culbertson, B.S., M.D., *Assistant Clinical Professor of Urology*  
 Gilbert Osterberg, A.M., M.D., *Assistant in Urology*  
 William Dabney Jarman, B.S., M.D., *Associate in Urology*  
 Gordon Rhodes MacDonald, B.S., M.D., *Clinical Instructor in Urology*  
 Herbert DeGrange Wolff, Jr., M.D., *Clinical Instructor in Urology*  
 Frederick Turner Reuter, M.D., *Clinical Instructor in Urology*

### 37-42, Clinics

#### The Staff

Clinical teaching and demonstrations on the use of anatomical exam-  
 ination, special emphasis on the use of ~~proctoscopy~~ ~~proctography~~ ~~proctography~~  
 Operative clinic and clinical teaching. D. C. General Hospital.

### 40-42 Urology

#### F. A. Reuter and Staff

Academic year—1 hour a week, 16 sessions

Lectures covering the entire field of urology including diseases, symp-  
 toms, and medical treatment.

### 40-42 Clinics

#### F. A. Reuter and Staff

Three hours a week, 16 sessions, 48 sessions during academic year.  
 Clinical demonstrations teaching in the Department of Urology and  
 medical history, with special emphasis given to diagnosis  
 treatment. University Hospital.

# DEGREES CONFERRED

## DOCTOR OF MEDICINE

JUNE 6, 1950.

David Kenneth Anderson	Ohio	Dr. Wayne Fisher	Ind.
A.B. 1931, Yale University		A.B. 1928, Union University	
John Norman Aschbach	Pa.	Newman Francis Lee	N.M.
James Albert Ayres	Ariz.	A.B. 1911, Clinton College	N.J.
A.B. 1922, University of Southern		John Frank	
California		B.S. 1921, Rutgers University	
Bruce Calmer Boring	Md.	Robert Campbell Cramer	Ind.
B.S. 1917, Georgetown University		B.S. 1922, University of Florida	
Jack Lee Jones	Ill.	Leon C. Cramer	
Frederic Thomas Barrington	Mass.	A.B. 1911, The George Washington	
A.B. 1917, Tufts University		University	
Frederic Foster Beckwith	Mass.	Marion Lee George	Kent.
B.S. 1914, Rollins College		(With distinction)	
Riley Black	Conn.	Robert George Hastings	Ariz.
(With distinction)		A.B. 1922, Stanford University	
A.B. 1922, Stanford University		Leah M. (Hend) Graham	Wash.
Charles Herman Brown	Fla.	B.S. 1921, University of Washington	
A.B. 1917, Lafayette College		Harold Russell Hunt	Ind.
Maxwell Lambert Brown	Va.	B.S. 1912, Franklin and Marshall	
A.B. 1919, The George Washington		University	
University		Elmer Herman	Ind.
David Paul Carlson	Calif.	(With distinction)	
(With distinction)		John Robert Huxley, Jr.	Ind.
A.B. 1921, Stanford University		A.B. 1921, Vanderbilt University	
Amos Canine	Pa.	Edwin Wilson Jackson	Calif.
A.B. 1912, Washington and Jefferson		A.E. 1922, Connecticut College	
College		Robert Allen Kitching	Pa.
Ernest Monroe Cooper	Vt.	(With distinction)	
Maurice Criss Conant	Calif.	B.S. 1922, Franklin and Marshall	
(With distinction)		College	
Henry Walter Dabland	Ill.	Richard William Kimmerling	Ind.
A.B. 1920, Vanderbilt College		Herbert Louis Kutz	Ind.
Newton Thomas Eberwein	Va.	(With distinction)	
(With distinction)		A.B. 1922, The George Washington	
Otto Der Stepanian	Iran	University	
A.B. 1922, Harvard University		Sarah Elmer Lee	Mass.
Harvey Jessinga De Witt	Calif.	(With distinction)	
Imogene Sime Dethlefs	Md.	A.B. 1922, Wells College	Mass.
B.S. 1918, Duke University		Melvin Arthur Lester	
M.S. 1920, Emory University		A.B. 1919, Minnesota State University	Mass.
Oliver Irving Doshak, Jr.	D.C.	Walter R. Lillie	
(With distinction)		B.S. 1911, Tufts College	
A.B. 1920, University of Michigan		Gerrald Franklin Lowe	
Leo Thomas Ellison	Wis.	A.B. 1911, The George Washington	
B.A. 1911, University of Wisconsin		University	
Linnaeus Joseph Ennet	D.C.	Robert Joseph Mayday, Jr.	Ind.
(With distinction)		A.B. 1922, Georgetown University	Mass.
A.B. 1912, Harvard University		Robert Gustav Moberg	
William Richard Egbert	Idaho	B.S. 1921, Minnesota State University	N.J.
B.S. 1912, Brigham Young University		James Ralph Moxam	
William Thomas Ellington	N.C.	A.B. 1912, Carolina College	N.J.
A.B. 1922, Tufts University		Frank Moseley	
George Joseph Ellis, Jr.	Md.	A.B. 1919, Tufts College	N.J.
A.B. 1922, Catholic University of		Robert John Moxley	
America		B.S. 1911, University at Vermont	Mass.
Richard Vernon Eriksenbeck	D.C.	Reginald Paul M. Murray	
B.S. 1912, University of Maryland		(With distinction)	
for J. A. Evans	Pa.	A.B. 1922, Western College	
A.B. 1920, Lehigh University		Robert Allen Moore	
M.S. 1922, The George Washington		A.B. 1912, Hake University	Mass.
University		Harold Robert Mendenhall	

Philip James Moore	Miss	Albert Lewis Mueller II	Pa
A.B. 1944, Pomona College		B.S. 1946, Pomona and Marshall	
Stanley A. Maltz, Jr.	Calif	Forest Thompson	Ohio
A.B. 1942, University of California		B.S. 1944, Western Reserve University	
Stanley Raulo Moore	Calif	Marion Eddy Williams Smith	Calif
A.B. 1944, University of California		Edward Paul Smith	Conn
Robert Norman Noyes	Va	William S. Sweeney	
A.B. 1941, U.S. Naval Academy		B.S. 1943, New Jersey University	
John Paul O'Neil	Ill	Kenneth T. Spence, Jr.	Ill
A.B. 1941, University of Chicago		A.B. 1941, University of Chicago	
Roy Andrew O'Neil	Va	Thomas Andrew Sweeney	Pa
Stanley Guyton O'Neil	I.C.	B.S. 1941, University of Pittsburgh	
B.S. 1941, The George Washington University		James Louis Ott	Va
Richard Livingston O'Neil	Va	A.B. 1941, The George Washington University	
A.B. 1941, The George Washington University		Carlton R. Ott	Utah
Robert James O'Neil	Ala	Norman Charles O'Neil	Fla
B.S. 1941, Howard College		B.S. 1941, Howard University	
Mark Joseph O'Neil	Mo	Earl Phillip O'Neil	Ill
B.S. 1941, University of Maryland		B.S. 1941, Washington College	
Harold Joseph O'Neil, II	Calif	James Joseph O'Neil	Mass
San Carlos O'Neil	Va	B.S. 1941, University of Massachusetts	
B.S. 1941, St. Francis College		Harold William O'Neil	I.C.
Robert Joseph O'Neil	Calif	B.S. 1941, The George Washington University	
A.B. 1941, University of California at Los Angeles		John Joseph O'Neil	Wash
Donald William O'Neil	Calif	B.S. 1941, University of Washington	
Donald William O'Neil	N.Y.	Kenneth Allen O'Neil	Pa
John Joseph O'Neil	I.C.	John Joseph O'Neil	
A.B. 1941, New York University		B.S. 1941, University of Pittsburgh	
Michael Joseph O'Neil	I.C.	Robert George O'Neil	I.C.
B.S. 1941, St. John's College		William Hubert O'Neil	N.Y.
Philip Joseph O'Neil	N.Y.	A.B. 1941, College of Saint Mary	
John Joseph O'Neil	N.Y.	John Paul	
A.B. 1941, Connecticut College		Lawrence Joseph O'Neil	I.C.
		William Joseph O'Neil	





[illegible]













## SUMMARIES OF REGISTRATION

1956-57

## NUMBER OF REGISTRANTS

NUMBER OF REGISTRANTS			
Class entrance	<input checked="" type="checkbox"/> 1957	1958	1959
Class entrance	<input checked="" type="checkbox"/> 1958	1959	1960
Class entrance	<input checked="" type="checkbox"/> 1959	1960	1961
Class entrance	<input checked="" type="checkbox"/> 1960	1961	1962
Class entrance	<input checked="" type="checkbox"/> 1961	1962	1963
Total			1963

## (GEOGRAPHICAL DISTRIBUTION OF STUDENTS)

State	Number of cases	State	Number of cases
Alabama	1	New Mexico	1
Arizona	2	New York	25
California	38	North Carolina	1
Colorado	1	Ohio	1
Connecticut	1	Oklahoma	1
Delaware	1	Oregon	2
District of Columbia	73	Pennsylvania	23
Florida	1	Rhode Island	2
Georgia	2	South Dakota	1
Hawaii	8	Texas	11
Idaho	5	Vermont	1
Illinois	1	Washington	8
Indiana	4	West Virginia	10
Iowa	1	Wisconsin	5
Kansas	1	Wyoming	1
Maine	1	Other	1
Massachusetts	15	Unreported	1
Michigan	5	Unreported	1
Minnesota	4	Unreported	1
Mississippi	5	Unreported	1
Missouri	1	Unreported	1
Montana	5	Unreported	1
Nebraska	1	Unreported	1
Nevada	15	Unreported	1

## GRADUATES OF COLLEGES REGISTERED IN THE School of Medicine

[illegible]







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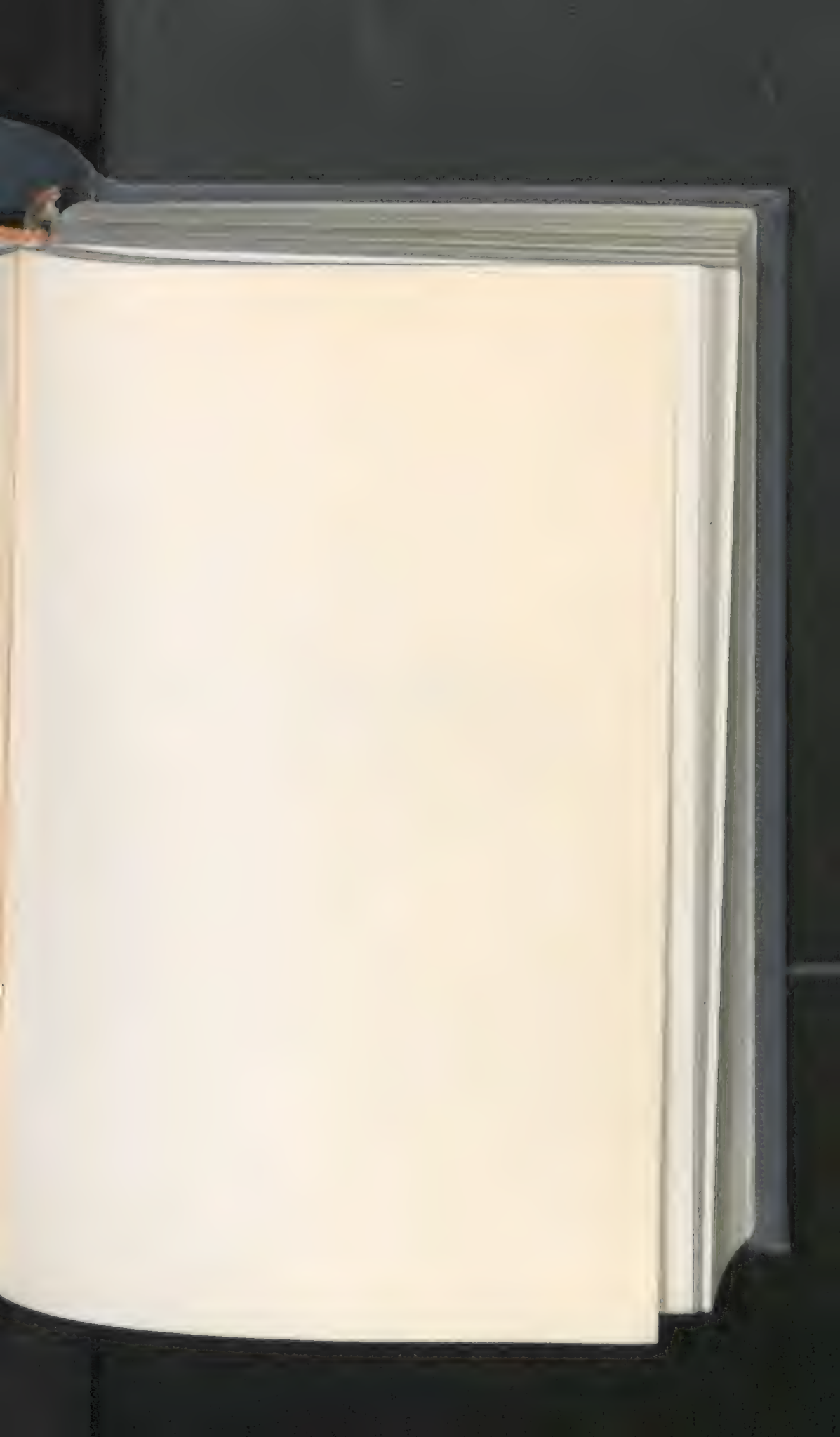
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THE LAW SCHOOL

1957-58





THE  
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WASHINGTON  
UNIVERSITY  
BULLETIN

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THE LAW SCHOOL

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WASHINGTON 6, D. C.

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BY THE UNIVERSITY



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# CALENDAR

1957-58

Date	Day	Remarks
<b>1957</b>		
<b>Session Term</b>		
June 2	Friday	Recesses for the week
June 10	Monday	First session begins
June 14	Thursday	Independence Day. Holiday
June 19	Friday	Last day of session
July 1-2-3	Saturday through Sunday	First summer examinations postponed
July 24	Wednesday	Recesses for students' council
July 25	Thursday	Second session begins
Sept. 2	Monday	Labour Day. Holiday
Sept. 4	Wednesday	Last day of session
Sept. 5-7	Thursday through Sunday	Second summer examinations postponed
<b>All Sessions</b>		
Sept. 12 and 13	Thursday and Friday	Recesses
Sept. 24	Monday	Full session begins
Oct. 15	Monday	Full session begins
Nov. 21	Monday	Armistice Day. Holiday
Nov. 22-23	Tuesday through Wednesday	Thanksgiving week
Dec. 24-25-26	Monday through Saturday	Christmas week
<b>1958</b>		
Jan. 4	Monday	Class begins
Jan. 10-11	Monday and Tuesday	Last day of session; day of graduation exercises at University of Toronto; session to be continued in June
Jan. 12-13	Monday through Tuesday	Graduation week
<b>Session Term</b>		
Feb. 10 and 12	Thursday and Friday	Recesses
Feb. 18	Monday	Second session begins
Feb. 22	Friday	Winter Convocation. Holiday
April 2-3	Friday through Saturday	First recess
May 12-17	Monday through Friday	Spring summer examinations postponed
June 1	Sunday	Recesses for the week
June 4	Wednesday	Discontinuation of session

THE UNIVERSITY





## THE BOARD OF TRUSTEES

The Board of Trustees of the University is composed of the President of the University *ex officio* and the following persons by election:

Robert Vedder Fleming, LL.D., *Chairman*

Newell Windom Elison, A.B., LL.B., *Secretary*

Clarence Aiken Aspinwall, LL.D., *Assistant Secretary*

---

Walter Maximilian Bastian, LL.B.

\*Daniel LeRay Borden, A.M., M.D.

Lyman James Briggs, Ph.D., Sc.D., D.Eng., LL.D.

John St. Clair Brookes, Jr., A.M., LL.B.

Mrs. Wilbur John Carr

Eugene Cassin Carusi, A.M., J.D.

\*Watson Davis, B.S. in C.E., C.E.

Mrs. Joshua Evans, Jr., A.B., Ed.D.

Charles Carroll Glover, Jr., A.M., LL.B., LL.D.

Ulysses S. Grant, 3d, B.S., Graduate United States Engineers School,  
LL.D., Sc.D.

Gilbert Grosvenor, A.M., LL.D., Litt.D., Sc.D.

\*Brooks Hays, A.B., LL.B., LL.D.

John Edgar Hoover, LL.M., LL.D.

Frank Atherton Howard, B.S. in M.E., LL.B.

Virted Henry Lawson, LL.B., LL.D.

John Keown McKee

Benjamin Mosby McKelway

\*James Matlack Mitchell, A.M.

Gustaf Leon Munter, A.B., LL.B., LL.D.

\*Helen Newman, LL.M.

Donald D'Arcy Shepard, LL.B.

Charles Hook Tompkins, D.Eng.

Walter Rupert Tuckerman, A.B., LL.B., LL.D.

James Edwin Webb, A.B., LL.D.

Alexander Wetmore, Ph.D., Sc.D.

\*Charles Stanley White, M.D., S.D.

Lloyd Bennett Wilson

\* Nominated by the Senate

## OFFICERS OF ADMINISTRATION

### THE UNIVERSITY

Cloud Heck Marvin, Ph.D., LL.D., *President of the University*  
Oswald Symister Colclough, B.S., LL.B., LL.D., *Dean of Faculty*  
Myrna Pauline Sedgwick, A.B., *Administrative Secretary*  
Henry William Herzog, B.S., *Treasurer*  
Claud Max Farrington, A.M., *Assistant to the President*  
Harold Griffith Sutton, M.S., *Director of Admissions*  
Fred Everett Nessell, A.B., *Registrar; Secretary of the Faculty*  
John Russell Mason, A.M., M.S. in L.S., *Librarian; Curator of Art*  
Benjamin Douglass Van Evera, Ph.D., Sc.D., *Coordinator of Scientific Activities*  
Virginia Randolph Kirkbride, A.M., *Director of Activities for Women*  
Don Carlos Faith, Ph.D., *Director of Activities for Men; Director of Veterans Education*  
Alan Thomas Deibert, A.M., *Adviser to Students from Foreign Countries*  
Burnice Herman Jarman, A.M., Ed.D., *Dean of the Summer Session*  
Richard Bernard Castell, A.B., M.D., *Director of Health Administration*  
Ruth Harriet Atwell, A.M., *Director of Women's Athletics*  
Carl Swyter, B.S. in E.E., *Director of Air Science*

### THE LAW SCHOOL

Oswald Symister Colclough, B.S., LL.B., LL.D., *Acting Dean of the Law School*  
Carville Dickinson Benson, A.B., LL.B., J.S.D., *Assistant Dean of the Law School*  
Louis Harkey Mayo, B.S., LL.B., J.S.D., *Assistant Dean of the Law School*  
David Benson Weaver, A.B., LL.B., *Director of Continuing Legal Education*  
Edward Andrew Potts, A.B., LL.B., *Secretary of the Law School*

### ADMINISTRATIVE ASSISTANTS

Anna Marie Bischoff, A.B., *Recording Secretary of the Law School*  
Bertha Margarethe Rothe, A.M., B.S. in L.S., LL.B., LL.M., *Assistant Librarian in Charge of the Law Library*  
Ethel Casey Schreiner, A.B., *Secretary to the Dean of the Law School*  
Pauline Bogsch, *Secretary in the Law School*  
Marjorie Grah Alestock, *Secretary in the Law School*

## THE UNIVERSITY

### HISTORY AND ORGANIZATION

The idea of a university in the Capital of the Nation was sponsored by George Washington, who during his public life urged the establishment of such an institution and who in his will left fifty shares of stock in the Potomac (Canal) Company for the endowment of a university to be established in the District of Columbia "to which the youth of fortune and talents from all parts thereof might be sent for the completion of their Education in all the branches of polite literature—in arts and Sciences,—in acquiring knowledge in the principles of Politics & good Government".

The George Washington University operates under a charter granted by an act of Congress of February 9, 1821, to Columbian College in the District of Columbia. In 1873 the name was changed to "Columbian University" and in 1904 to "The George Washington University".

The University as it is now organized consists of the Junior College, comprising the work of the freshman and sophomore years; Columbian College, the senior college of liberal arts, which offers work leading to the Bachelor's and Master's degrees; the Graduate Council, which offers work leading to the degree of Doctor of Philosophy; the professional schools, which include Medicine, Law, Engineering, Pharmacy, Education, and Government; the College of General Studies; the Division of University Students; the Division of Special Students; the Division of Air Science; and the Summer Sessions.

### ACADEMIC STATUS

The George Washington University is accredited by its regional accrediting agency, the Middle States Association of Colleges and Secondary Schools. This is important to students who wish to transfer credits from one institution to another.

The University is on the approved list of the American Association of University Women and is a member of the College Entrance Examination Board.

The Law School is a charter member of the Association of American Law Schools and is approved by the Section of Legal Education and Admissions to the Bar of the American Bar Association.



## LOCATION

The George Washington University is in downtown Washington, four blocks west of the White House and east of the Potomac River with its extensive parkway. Within a few blocks are the buildings housing the offices of many of the departments of the Government, including the Department of State, the Department of the Treasury, the Department of Justice, the Department of the Interior, the Department of Agriculture, the Department of Commerce, and the Department of Labor. Also readily accessible are the Capitol, the Library of Congress, the National Archives, the Supreme Court, and other federal courts.

THE LAW SCHOOL





## THE LAW SCHOOL

### THE FACULTY AND STAFF OF INSTRUCTION

- CLOYD HICK MARVIN, Ph.D., LL.D., *President of the University*  
 OSWALD SYMISTER CHELDRGH, B.S., LL.B., LL.D., *Dean of Faculty*  
*Associate Dean of the Law School*  
 CARVILLE DICKINSON BENSON, A.B., LL.B., S.J.D., *Assistant Dean of the Law School*  
 LOUIS HARLEY MAY, B.S., LL.B., J.S.D., *Assistant Dean of the Law School*  
 DAVID BENSON WEAVER, A.B., LL.B., *Director of Continuing Legal Education*

### EMERITUS FACULTY

- GEORGE HOWDIN CRAIGHILL  
*Professor Emeritus of Law*  
 A.B. 1901, University of the South; LL.B. 1906, Georgetown University.  
 GILBERT LEWIS HALL  
*Professor Emeritus of Law*  
 A.B. 1899, Sweethome College; LL.B. 1918, The George Washington University.  
 JOHN WILMER LATIMER  
*Professor Emeritus of Law*  
 LL.B. 1897, The George Washington University.  
 WALTER LEWIS MOLL  
*Professor Emeritus of Law*  
 A.B. 1898, Concordia College (Ind.); Graduate 1899, Concordia Theological Seminary (St. Louis); LL.B. 1922, Indiana University; S.J.D. 1924, Harvard University.  
 ALVIN LEROY NEWMYER  
*Professor Emeritus of Law*  
 LL.B. 1906, The George Washington University.  
 HECTOR GALLOWAY SPAULDING  
*Professor Emeritus of Law*  
 B.S. 1899, University of Minnesota; LL.B. 1901, S.J.D. 1924, Harvard University.

### ACTIVE FACULTY

- CARVILLE DICKINSON BENSON  
*Professor of Law, Assistant Dean of the Law School*  
 A.B. 1920, Johns Hopkins University; LL.B. 1924, S.J.D. 1926, Harvard University.  
 THOMAS HAYWARD BROWN  
*Lecturer in Law*  
 Member of the bar of the District of Columbia.  
 JOHN PATRICK DEBEE  
*Associate Professor of Law*  
 A.B. 1929, LL.B. 1931, The George Washington University.

\* The President of the University, the Dean of Faculty, the Dean and Assistant Deans of the School, the members of the University and Division of Administration of the University, the Faculty, Adjunct Professors, Associate Professors, and Assistant Professors constitute the Faculty.  
 The Law School is organized by the University of the South.  
 The Law School is located in the University of the South.

## OSWALD SYMISTER COLCLOUGH

*Professor of Law, Dean of Faculty, Acting Dean of the Law School*

B.S. 1901, United States Naval Academy; LL.B. 1915, The George Washington University; LL.D. 1945, Washington College

## CHARLES SAGER COLLIER

*Professor of Law*

A.B. 1911, LL.B. 1913, S.J.D. 1915, Harvard University

## ROBERT MCKINNEY COOPER

*Associate Professor of Law*

Ph.M. 1931, University of Wisconsin; J.D. 1934, University of Michigan

## JOHN JOSEPH CZYZAK

*Professorial Lecturer in Law*

A.M. 1939, John Carroll University; LL.B. 1942, Western Reserve University

## \*STEPHEN DACH

*Professorial Lecturer in Law*

LL.D. 1922, University of Bologna; LL.B. 1939, The George Washington University

## CARL CLELL DAVIS

*Lecturer on Law*

B.S. 1921, CHAMBER, AGRICULTURE and MECHANICAL COLLEGE; LL.B. 1929, University of California; LL.M. 1931, The George Washington University

## JAMES FORRESTER DAVISON

*Professor of Law*

A.B. 1911, LL.B. 1913, Delaware University; LL.M. 1924, S.J.D. 1927, Harvard University

## ROBERT GALLOWAY DIXON, Jr.

*Associate Professor of Law*

AB. 1915, Ph.D. 1917, Syracuse University; LL.B. 1919, The George Washington University

## JOSEPH PATRICK DRISCOLL

*Associate Professor of Law*

AB. 1915, LL.B. 1917, Harvard University

## JUSTIN LINCOLN EDDINGTON

*Professorial Lecturer in Law*

AB. 1916, LL.B. 1917, The George Washington University

## IRVIN THOMPSON FRY

*Professorial Lecturer in Law*

LL.B. 1926, University of Maryland; M.A. 1927, Harvard University; J.S.D. 1932, Yale University

## ETTY BLAIR FRANK

*Special Lecturer in Law*

A.B. 1915, University of Wisconsin; LL.D. 1926, The George Washington University

## WILLIAM THOMAS FRYER

*Professor of Law*

A.B. 1917, LL.B. 1919, The George Washington University; J.D. 1924, Yale University

## CROMBIE JAMES DICKINSON GARRETT

*Lecturer in Law*

A.B. 1925, Amherst College; LL.B. 1927, Yale University

\* On leave of absence 1941-42.

† On leave of absence fall semester 1941-42.

EUGENE WILLIAM GENIESSE

*Lecturer in Law*

B.E. 1930; M.S. 1934, University of Michigan; LL.B. 1935, The George Washington University.

WILLIAM WOOLCOTT GOODRICH

*Lecturer in Law*

LL.B. 1938, University of Texas.

ALFRED HANTMAN

*Original Lecturer in Law*

A.B. 1932, *Doublet Volume*; LL.B. 1936, The George Washington University.

LOUIS JAMES HARRIS

*Professorial Lecturer in Law*

A.B. 1932, Cornell University; LL.B. 1936; S.J.D. 1942, *Doublet (Law School)*; LL.M. 1948, The George Washington University.

PHILIP FIELD HERRICK

*Professorial Lecturer in Law*

A.B. 1928, Williams College; LL.B. 1932; LL.M. 1936, The George Washington University.

JOHN WINGFIELD JACKSON

*Adjunct Professor of Law*

B.S. 1926, University of Pennsylvania; LL.B. 1927, The George Washington University.

JOHN ALEXANDER KENDRICK

*Chief of the First Practice Court*

A.B. 1926; LL.B. 1931, The George Washington University.

JAMES ROBERT KIRLAND

*Adjunct Professor of Law*

A.B. 1927; LL.B. 1931; LL.M. 1934, The George Washington University; Judge, United States District Court for the District of Columbia.

VINCENT KLEINFELD

*Lecturer in Law*

LL.B. 1936, Cornell University.

MILTON PAUL KROLL

*Lecturer in Law*

A.B. 1914, West Virginia University; LL.B. 1917, Harvard University.

SAMUEL JOSEPH L'HOUEMEDEU, Jr.

*Special Counsel in Law*

B.E. 1926, University of Missouri; LL.B. 1928, The George Washington University.

HERBERT ARTHUR LIEBOW

*Lecturer in Law*

LL.B. 1933, University of Virginia.

MORTIMER JAMES LAW

*Adjunct Professor of Law*

LL.B. 1911; LL.M. 1926; LL.D. 1930, Georgetown University; Chief Justice, United States District Court for the District of Columbia.

WILLIAM THOMAS MALAMON, Jr.

*Adjunct Professor of Law*

A.B. 1926, University of Washington; LL.B. 1928, Vanderbilt University.

\*The issue of January 1951 contains 1950-51.



## LOUIS HARRY MAYO

*Associate Professor of Law, Assistant Dean of the Law School*  
 B.S. 1940, United States Naval Academy; LL.B. 1942, University of Virginia; J.S.D.  
 1953, Yale University.

## JOHN ALBERT MCINTIRE

*Postgraduate Lecturer in Law*  
 A.B. 1928, LL.D. 1954, Wittenberg College; LL.B. 1941, University of Cincinnati.

## LEROY SORJINSON MERRIFIELD

*Professor of Law*  
 A.B. 1938, LL.B. 1941, University of Missouri; M.P.A. 1942, J.D. 1946, Harvard  
 University.

## GEORGE EDWARD MONK

*Professor of Law*  
 A.B. 1928, LL.B. 1930, LL.M. 1934, The George Washington University.

## \*JAMES WARD MORRIS

*Adjunct Professor of Law*  
 A.B. 1932, University of North Carolina; Judge, United States District Court for the  
 District of Columbia.

## JAMES OLIVER MURDOCK

*Professor of Law*  
 Ph.D. 1946, University of Chicago; LL.B. 1924, Harvard University.

## FRANK HAMMETT MYERS

*Adjunct Professor of Law*  
 LL.B. 1933, LL.M. 1941, The George Washington University; Judge, Municipal Court of  
 the District of Columbia.

## HERMAN ISRAEL ORENTLICHER

*Professor of Law*  
 A.B. 1931, LL.B. 1936, Harvard University.

## GEORGE NELSON ROBILLARD

*Lecturer in Law*  
 B.S. 1924, United States Naval Academy; LL.B. 1930, St. John's University.

## PAUL ARCHIBALD ROSE

*Lecturer in Law*  
 LL.B. 1940, Washington College of Law.

## DUDLEY GRAHAM SKINNER

*Associate Clerk of the Tax Practice Court*  
 LL.B. 1940, The George Washington University.

## ALEXANDER LOUIS STEVAS

*Special Lecturer in Law*  
 LL.B. 1941, The George Washington University.

## ORVILLE HASSLER WALBURN

*Typing Professor of Law*  
 A.B. 1924, Franklin and Marshall College; LL.B. 1926, University of Pennsylvania;  
 LL.D. 1942, Georgetown University.

## LEONARD PATRICK WALSH

*Postgraduate Lecturer in Law*  
 A.B. 1927, University of Missouri; LL.B. 1931, National University; Ph.D.  
 Municipal Court for the District of Columbia.

\*On leave of absence until summer, 1957.

DAVID BENSON WEAVER

*Associate Professor of Law; Director of Continuing Legal Education*  
A.B. 1941, Ohio Wesleyan University; LL.B. 1948, Western Reserve University

GLEN EARL WESTON

*Associate Professor of Law; Editor in Chief of the Law Review*  
B.S. 1941, University of Maryland; LL.B. 1948, The George Washington University

CHARLES JAMES ZINN

*Professorial Lecturer in Law*  
A.B. 1947, LL.B. 1950, Fordham University; LL.M. 1951, S.J.D. 1954, Georgetown University

COMMITTEES \*

THE DEAN'S COUNCIL

William Thomas Fryer	Carville Dickinson Benson
James Forrester Davison	James Oliver Murdock
Leroy Sorenson Merrifield	Herman Israel Orentlicher
Robert McKinney Cooper	

COMMITTEE ON ADMISSIONS

Carville Dickinson Benson, <i>Chairman</i>	
Louis Harkey Mayo	Harold Griffith Sutton

COMMITTEE ON GRADUATE STUDIES

James Forrester Davison, <i>Chairman</i>	
James Oliver Murdock	Leroy Sorenson Merrifield
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COMMITTEE ON SCHOLARSHIP

John Patrick Burke, <i>Chairman</i>	
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COMMITTEE ON CURRICULUM

Herman Israel Orentlicher, <i>Chairman</i>	
William Thomas Fryer	James Forrester Davison
Robert McKinney Cooper	David Benson Weaver

LIBRARY COMMITTEE

David Benson Weaver, <i>Chairman</i>	
William Thomas Mallon, Jr.	Robert Galloway Dixon, Jr.

\* The President of the University, the Deans of Faculties, and the Dean and Assistant Deans of the Law School are members or officers of all committees.

## GENERAL INFORMATION

## LOCATION IN THE NATION'S CAPITAL

The George Washington University Law School, now in its 92d year, is the oldest law school in the District of Columbia. The School took part as a charter member in 1900 in the organization of the Association of American Law Schools and it has been an active member of the Association since that time. It is approved by the Section of Legal Education and Admissions to the Bar of the American Bar Association.

National University, which has had an important place in legal education in the District of Columbia since 1869, was merged into The George Washington University in August 1954.

Of special significance is the location of the Law School in the Nation's Capital, the focal point of the law in action, both American and international. The work of the School goes on in this environment, presenting a unique opportunity for observation and study of federal agencies—judicial, legislative, and administrative. Readily accessible are the Supreme Court of the United States, the federal trial and appellate courts of the District of Columbia, and, in addition, federal courts of special jurisdiction, such as the United States Court of Claims, the United States Court of Customs and Patent Appeals, and the Tax Court of the United States. Current federal legislation can be studied as it is considered by Congressional committees and as it comes up for debate on the floor of the House of Representatives and the Senate. It is with respect to the federal administrative agencies that the students here in Washington have matchless opportunities for study and observation. They can attend informal and formal hearings of these agencies and can obtain from the docket sections complete records of administrative adjudication in specific cases. Illustrative of such federal agencies are the Interstate Commerce Commission and the Civil Aeronautics Board in the field of transportation; the Federal Trade Commission in the field of trade regulation; the Securities and Exchange Commission in the field of security issues and corporate finance; the National Labor Relations Board in the field of labor-management relations; the United States Patent Office in the field of patent law; the Federal Power Commission in the field of water, natural gas, and electric power; and the Federal Communications Commission in the field of radio and television.

Supplementing these environmental advantages of law in action are the exceptional research library collections in the Library of Congress, in the various departments of the Federal Government, and in the libraries of the headquarters of national and international organizations located in Washington. The notable library of the Carnegie Foundation for International Peace has been acquired by The George Washington University for use of research students in international and com-



parative law, fields with respect to which Washington has come to be called "The Capital of the World".

The years of residence at law school are years of participation in the life of the community, which in the case of the George Washington University Law School, is the government of the United States by law. As a consequence, the study of law takes on added meaning, whether the goal be government service or practice, general or specialized.

#### OBJECTIVES

The primary purpose of the Law School is to prepare men and women to meet the needs of society in the many fields of law, public and private. These needs call not only for technical skill but also for responsible leadership in the development of the law and the administration of justice. In fulfilling these responsibilities the Law School offers: (1) a program of study in preparation for the practice of law; (2) programs of study and research on the graduate level for foreign as well as for American students; (3) a continuing legal education program for members of the bar; (4) institutes and forums on current topics in domestic and foreign law; (5) the publication of a law journal containing the results of research in public law; and (6) the encouragement of student professional co-curricular activities.

#### PROGRAMS OF STUDY

Traditionally the Law School has been national in the geographic distribution of its students. At the present time, men and women holding baccalaureate degrees from more than three hundred colleges and universities come from the forty-eight states, the territories, and several foreign countries to comprise the student body. As a consequence the programs of study leading to the degrees of Bachelor of Laws and Juris Doctor have been planned to provide instruction and training for the practice of law wherever the Anglo-American legal system obtains.

Graduate work leading to the degrees of Master of Laws and Doctor of Juridical Science is offered for those desiring further study and research in specialized fields of law.

Provision is made for advanced study by members of the bar who do not desire to register as candidates for degrees. Lawyers may take courses for this purpose either as confessed graduate students or as continuing legal education students.

Graduate work is offered also to meet the needs of lawyers who come from countries whose legal systems are not based on the English law. There are two programs of study, one leading to the degree of Master of Comparative Law for lawyers planning to return to their own countries, and the other leading to the degree of Master of Comparative Law

(American Practice) for lawyers planning to remain in this country for the practice of law.

#### ORGANIZATION OF THE CURRICULUM

The curriculum is organized so that students may enter the Law School at the beginning of the fall or spring semester of the academic year, or at the beginning of the summer term. (For summer term information see page 34.)

#### MORNING AND EVENING DIVISIONS

Morning classes, other than Trial Practice Court, meet for fifty-minute periods between 9:10 A.M. and 1:00 P.M., Monday through Friday; Trial Practice Court meets for a two-hour period from 9:30 to 11:30 A.M. on Saturday.

Evening classes meet for two fifty-minute periods from 5:50 to 7:40 P.M., Monday through Friday. A four-credit course, e.g., Torts, meets two evenings a week; a two-credit course, e.g., Personal Property, meets one evening a week. The evening division conforms to the standards of the morning division and has the same teaching staff.

#### THE LIBRARY

The Law Library of *GWU* contains the official reports of the decisions of the courts of last resort of all states prior to the National Reporter System, and of some states complete to date; the National Reporter System, complete; the reports of the United States Supreme Court and lower federal courts, and the reports of federal administrative agencies; Shepard's Citations for the units of the Reporter System; the English Reports, Full Report; the English Law Reports, the Times Law Reports; the Dominion Law Reports; the United States statutes and codes; complete sets of statutes of all the states; the English statutes; the principal English and American digests and encyclopedias; collections of special reports and annotated cases; United Nations documents; leading textbooks and treatises; and practically complete sets of about 150 legal periodicals. A section of the library, consisting of books acquired from National University, is known as the National University Law Collection.

The international law collection, formerly the library of the Carnegie Endowment for International Peace, is available to law students.

The Library, which is on the fourth floor of Stockton Hall, is open from 9:00 A.M. to 10:00 P.M., Monday through Friday; from 9:00 A.M. to 5:00 P.M. on Saturday; and from 2:00 to 6:00 P.M. on Sunday. Books and other materials do not circulate and must be used in the library.

## THE LAW REVIEW

*The George Washington Law Review*, published by the University, is edited and managed by students of the Law School under the supervision of faculty advisers. It is devoted exclusively to state and federal public law. The location of the University in the National Capital, where the primary sources of federal public law may be observed in operation, affords an unexcelled opportunity for specialization in this field.

The *Review* organization includes a faculty editor-in-chief, an associate faculty editor, a faculty board of advisory editors, a board of departmental advisory editors, and a board of student editors. The student editors are chosen each year on the basis of scholarship.

## THE STUDENT BAR ASSOCIATION

Every student in the Law School is a member of the Student Bar Association, which is organized to enable students to become better acquainted with problems of the profession, to foster professional ideals, and to bring about closer contact with members of the profession engaged in active practice of the law.

The work of the Student Bar Association is carried on by various committees and by group and general meetings of a professional and social nature. From time to time lectures are given by outstanding authorities on legal and professional problems.

An important activity is the Van Vleck Case Club Competition, which provides an opportunity for training in appellate advocacy. First and second year students participate as contestants before courts composed of members of the Faculty and the local bar. Senior law students of the Case Club also sit as judges. The final argument is held before a court composed of distinguished federal judges.

## ORDER OF THE COIF

The Order of the Coif, a national honor society with chapters in over forty law schools, aims "to foster a spirit of careful study and to mark in a fitting manner those who have attained a high grade of scholarship." The George Washington University Chapter was established in 1926. Members are elected each year from the highest-ranking 10 per cent of the graduating class of the Law School.

## ADMISSION

## APPLICATION FOR ADMISSION

The Law School, as other colleges, schools, and divisions of the University, is coeducational.

An applicant for admission must obtain from the Office of the Director



of Admissions of the University an application blank which he must fill out completely and return with the application fee of \$3.

Two recent photographs must accompany the blank.

*To insure prompt action, applications should be filed not later than August 1 for the fall semester, January 1 for the spring semester, and May 1 for the summer sessions.*

Requirements concerning records of higher institutions previously attended are set forth on the sheet attached to the application blank.

Attendance at classes is limited to students registered for credit and continuing legal education students. "Auditing" classes is not permitted.

#### REQUIREMENTS FOR ADMISSION

For the Degrees of Bachelor of Laws and Juris Doctor

*Bachelor of Laws*.—A Bachelor of Arts or equivalent degree awarded upon completion of a four-year course in an approved college or university is required. The baccalaureate record must be of satisfactory quality and must include an acceptable distribution of courses. An applicant will not be admitted who has been in attendance at another law school and who is ineligible to return to that school in good standing. From the applicants a selection will be made by the Committee on Admissions.

*Juris Doctor*.—A student does not register as a candidate for this degree until his last year in the Law School. For details, see page 20.

#### ADVANCED STANDING

Advanced standing toward the degree of Bachelor of Laws will be granted only for work successfully completed in other law schools which are members of the Association of American Law Schools. However, credits will not be recognized in excess of those which might be obtained in a similar period in this Law School.

Advanced standing will not be granted for law work already counted toward the Bachelor of Arts or other pre-legal degree.

Advanced standing will not be granted toward meeting the requirements for the degrees of Juris Doctor or Master of Laws.

#### For the Graduate Degrees

Candidates for graduate degrees must be accepted by the Committee on Graduate Studies.

*Master of Laws*.—A Bachelor of Arts or equivalent degree from an approved college or university and a Bachelor of Laws or equivalent degree from a member school of the Association of American Law Schools are required. Candidates for admission must have attained a B

average on all work done for the Bachelor of Laws degree, except that, at the discretion of the Committee on Graduate Studies, applicants otherwise eligible may be admitted on proof of experience and attainment as an alternative. Advanced standing will not be granted for credits earned while a candidate for the first degree in law. Credits earned as an unclassified student will not be applicable toward meeting the requirements of the degree unless specific provision therefor is included in the letter of admission.

*Master of Comparative Law and Master of Comparative Law (American Practice).*—The following are required: (1) the successful completion of and graduation from a course in arts, philosophy, letters, or sciences, equivalent to graduation from a gymnasium, lycee, or keeo; and (2) graduation in law from a recognized foreign university where training was in Civil Law.

*Doctor of Juridical Sciences.*—The following are required: a Bachelor of Arts or equivalent degree from an approved college or university and a Bachelor of Laws or equivalent degree, earned with high rank, from a member school of the Association of American Law Schools, and outstanding capacity for scholarly work in the field of law.

#### Unclassified Students

A person who is in good standing as a degree candidate in another law school which is a member of the Association of American Law Schools may, at the discretion of the Dean, be admitted as an unclassified student in order to earn credits for transfer to the other law school.

A person who is a member of the bar or a person, not a member of the bar, who is a graduate of a member school of the Association of American Law Schools may, at the discretion of the Dean, be admitted as an unclassified student.

Unclassified students participate in the work of the course and take examinations. Courses taken by unclassified students will not be credited toward degrees at this Law School.

#### Continuing Legal Education Students

A simplified admission and registration procedure is provided for members of the bar desiring to register as continuing legal education students to take courses on a non-credit basis. Members of the bar desiring to register as degree candidates or as unclassified graduate students should file the regular application for admission form.

\* One-half the work necessary for graduation from an approved college or university may be accepted as satisfying the admission requirement for pre-law work, provided the applicant completed not less than twenty months of continuous service in the armed forces of the United States during World War II and prior to the beginning of the thirty-sixth semester.

## REGISTRATION

Before attending classes each student must present himself in person for registration. No student will be registered in the Law School until proper credentials have been filed and approved (see "Admission", above).

Registration is for the semester or session only.

A late-registration fee of \$5 will be charged each student who is permitted to register after the regular registration days.

Registration may be changed only with the permission of the Dean.

## FEES AND FINANCIAL REGULATIONS

Admission fee, charged each applicant for admission, non-refundable	\$1.00
Tuition fee, for each semester term for which the student registers	12.00
For the degree of Doctor of Juridical Science:	
For each session in and including the final examinations	\$10.00
Student Bar Association fee, charged each student in the Law School for each session or any part thereof except the summer sessions	3.00
Graduation fee	25.00
For the printing of diploma of Doctoral Juridical Science	\$4.00
For the special examinations for each subject	1.00
Registration fee, charged each student who fails to register within the designated period	5.00
Residence fee, charged each student residing in quarters on campus during any semester or session of the University or other institution of higher learning	1.00
Service fee, charged each student for late payment of tuition, or "Payment of Fees"	2.00
Reinstatement fee, charged each student who is reinstated after being suspended for delinquency in fees	5.00

Registration in the University entitles each student to the following University privileges: (1) the issuance of one certified transcript of record, if and when desired; (2) the services of the Placement Office; (3) the use of University library facilities, except as otherwise designated; (4) gymnasium privileges; (5) admission to all athletic contests, unless otherwise specified; (6) subscription to the *University Hatchet*, the student newspaper; (7) admission to University debates; (8) medical attention and hospital services as described under "Health Administration", pages 47-48. These privileges, however, with the exception of the issuance of transcripts, terminate, and a student is no longer in residence when he withdraws or is dropped from the University.

## PAYMENT OF FEES

All fees are payable at the Office of the Cashier, 725 Twenty-first Street NW. No student is permitted to complete registration or to attend classes until all fees are paid. Fees for each semester are due and payable in advance at the time of registration.



Subject to the approval of the Treasurer, a student may sign a contract for semester charges, except for fees payable in advance, permitting payments as follows:

*Fall Semester.*—One third at the time of registration; one third on November 1; one third on December 2.

*Spring Semester.*—One third at the time of registration; one third on March 1; one third on April 1.

A student who fails to meet payments when due but who pays his fees on or before the fifteenth of the month in which payment is due is charged a service fee of \$2. A student who fails to meet payments by the fifteenth of the month in which payment is due will be automatically suspended and may not attend classes until he has been officially reinstated and has paid all accrued fees and a reinstatement fee of \$5.

A student suspended for failure to meet payments when due may not be reinstated for the semester after two weeks from the date of suspension. Applications for reinstatement are to be made to the Office of the Cashier.

#### WITHDRAWALS AND REFUNDS

Application for withdrawal from the University or for change in class schedule must be made in person or in writing to the Dean. Notification to an instructor is not an acceptable notice.

In authorized withdrawals and changes in schedules, financial adjustments will be made as follows:

*Fall Semester.*—Withdrawal dated on or before October 31, cancellation of two thirds of tuition charges; withdrawal dated on or before November 30, cancellation of one third of tuition charges. No refund or reduction will be allowed on a withdrawal dated subsequent to November 30.

*Spring Semester.*—Withdrawal dated on or before February 28, cancellation of two thirds of tuition charges; withdrawal dated on or before March 31, cancellation of one third of tuition charges. No refund or reduction will be allowed on a withdrawal dated subsequent to March 31.

In no case will a refund be made of the first third of the total tuition charges unless the registration is in advance and the course is dropped before the regular registration day. In this case a withdrawal fee of \$5 is charged and tuition fees refunded. In no case will tuition be reduced or refunded because of nonattendance in classes.

Payment applies only to the semester for which a registration charge is incurred and is no part of the amount to be credited to another semester.

Authorization to withdraw and instruction for work done will not be given a student who has not a clear financial record.

Withdrawal from a course or from the University between October 31 and the end of the fall semester and between February 28 and the end of the spring semester is permitted only in exceptional cases.

The grade of *F* (to be counted as zero) will be given in a course dropped without the approval of the Dean.

All charges for courses dropped without the approval of the Dean must be met by the student. Reporting the dropping of a course to an instructor does not effect its discontinuance.

#### FELLOWSHIPS, SCHOLARSHIPS, PRIZES, LOAN FUNDS

*Law School Research Assistantships.*—Student research assistantships are available each year to students currently enrolled in the Law School, preference being given to applicants who are completing their second year. Each assistant receives an annual stipend. Awards are made on the basis of academic standing, financial need, and capacity for leadership. Research assistants have duties similar to those of teaching fellows. Applications should be submitted to the Dean of the Law School not later than May 1.

*Law School Teaching Fellowships.*—Teaching fellowships are available each year to prospective candidates for the Master of Laws degree. Each fellow receives an annual stipend, plus tuition for one academic year. Teaching fellows follow an approved program of study and research, assist members of the Faculty in the guidance of first year students, and supervise student work in legal bibliography and the drafting of legal instruments. Upon satisfactory completion of the year's work, a fellow is recommended for the degree of Master of Laws. Applications should be submitted to the Dean of the Law School not later than March 1.

*Charles Worthington Dancy Memorial Scholarship.*—This scholarship, established in 1917 as a memorial to Charles Worthington Dancy, Bachelor of Laws, 31; Master of Laws, 32, is awarded upon the recommendation of the Faculty of the Law School to a needy and promising graduate of Columbian College or other division of the University, with a Bachelor of Arts or other equivalent degree, who has maintained an average of *B* as an undergraduate student and who desires to pursue the study of law as a full time student. The scholarship covers tuition for the course leading to the first degree from the Law School, Bachelor of Laws or Juris Doctor, provided that the holder maintains an average of *B*. The right is reserved to suspend the benefits of the scholarship for cause at any time. The scholarship is awarded ordinarily once every three years.

*Law School Scholarships.*—Scholarships are available each year in the Law School to graduates of accredited colleges. Each scholarship pro-

vides full three year tuition in the morning division of the Law School. Candidates must have graduated in the upper fifth of their class and must have demonstrated qualities of leadership in addition to scholastic attainment. To retain the scholarship, the successful candidate must maintain a *B* average. Application must be made before March 1 to the Dean of the Law School.

*Ellsworth Prize.*—The Ellsworth Prize of \$25, established by the late Mr. Fritz von Briesen, is awarded to the student doing the best work in the subject of Patent Law Practice.

*John Bell Larnet Prize.*—This prize, established by the bequest of John Bell Larnet, consists of a medal which is awarded annually to that member of the graduating class in the Law School who attains the highest average grade in the entire course for the degrees of Bachelor of Laws or Juris Doctor.

*John Ordronaux Prizes.*—These prizes were established in 1909 by the bequest of John Ordronaux.

The amount of \$75 is awarded annually to the student in the Law School who has attained the highest average grade in the first-year, full-time course; and \$75 to the student who has attained the highest average grade in the second year, full time course.

Through the generosity of friends of the University a number of loan funds are available to students in the Law School. Among them is the Henry Strong William A. Maury Loan Fund established by the Henry Strong Educational Foundation in memory of Henry Strong and William A. Maury. Application for loans should be made to the Treasurer of the University.

#### REGULATIONS

*Students in the Law School are subject to, and are expected to familiarize themselves with, the general University regulations stated in the University Catalogue.*

#### AMOUNT OF WORK

Students without substantial outside employment may take a program of studies of fourteen hours a week. Such students may take courses in the evening only if they are not available in the morning and if a majority of the hours taken are in morning courses. Students, whether in the morning or evening division, with substantial outside employment must take a limited program of studies not exceeding ten hours a week. Students taking a majority of their classes in the evening may not take more than ten hours a week. A minimum schedule of ten hours in the morning division and six hours in the evening division is required except in exceptional circumstances when authorized by the Dean.



## ATTENDANCE

Regular attendance at classes is required and is necessary for successful work. A student who is deficient in class attendance in any course may be barred from taking the examination.

## RESIDENCE REQUIREMENTS

Candidates for the degree of Bachelor of Laws must complete a residence period of three academic years. Attendance in the morning division for the fall and spring semesters constitutes residence for an academic year; similar attendance in the evening division constitutes residence for three fourths of an academic year. Consequently, a morning student must attend six semesters to meet residence requirements; an evening student must attend eight. Students authorized to take schedules of less than ten hours in the morning division or less than six hours in the evening division receive residence credit on a proportional basis. Students who attend the summer sessions receive fractional residence credit. For details, see page 34.

Students planning to attend summer school sessions at other law schools and desiring to use credits obtained at such schools in their course at this Law School must first have the courses they wish to take approved by the Dean. In no event will credit be recognized in excess of those which might be obtained in a similar period in this School.

## GRADUATION REQUIREMENTS

*Application for Graduation.* Application for a degree should be filed in the Office of the Registrar at the time of registration for the last semester of the senior or final year.

*Presence at Graduation.*—A candidate is required to be present at the graduation exercises unless written application for graduation in absentia is approved by the Dean.

## EXAMINATIONS

Written examinations are held at the end of each course. Every student is required to take the regular examinations unless excused. No excuse for absence will be granted except by the Dean and then only for illness or other emergency. Application for excuse must be made in writing not later than one month after the date of the examination. A grade of *NG* (no grade) will be entered on the record of a student thus excused, and he may take the next regularly scheduled examination in the course for which the excuse has been granted.

No special examinations will be given, except that, upon written appli-

cation to the Dean, showing sufficient cause, a candidate for a degree at a convocation before the next regular examination, if he would be entitled to take a postponed examination, may, at the discretion of the Faculty, be given a special examination.

If a student fails to take an examination, a grade of *F* (to be counted as zero) will be recorded unless he has been excused from the examination as provided above or has obtained the Dean's permission to drop the course.

#### GRADES

Grades are indicated by the letters *A*, excellent, 85-100; *B*, good, 75-84; *C*, satisfactory, 65-74; *D*, poor, 55-64—below standard for graduation; *F*, failed—below 55; and *NG*, no grade—student excused from failure to take regularly scheduled examination. See "Examinations" above, for grade upon failure to take an examination. The grades *A*, *B*, *C*, and *D* mean that the work has been completed and credit given for the courses. *F*, failed, means that no credit will be given. To obtain credit the student must repeat the course, except that a student who has obtained an average of *C* in the work of the semester just completed and the preceding semester and received a grade of *F* in only one course during those semesters may, with the consent of the Faculty, take the next regular examination in that course if he has not been excluded previously for low scholarship. If the failure occurs in the first semester, the succeeding semester is used as the second semester. The privilege is limited to taking the next regular examination, except that a candidate for a degree at a convocation before the next regular examination may be permitted to take a special examination at the end of the next semester. If on the reexamination the student receives a passing grade he will be given credit in the course. Both grades are recorded.

#### EXCLUSION AND PROBATION FOR POOR SCHOLARSHIP

*Candidates for the Degrees of Bachelor of Laws and Juris Doctor.*—A student who in one semester, or two successive semesters, fails in courses aggregating eight or more semester hours will be excluded, except that if currently registered he will be permitted to complete the work of the semester. Such a student is not eligible thereafter to be registered in the Law School or to attend classes. While excluded he may, however, with the consent of the Faculty, be admitted to the next regular examinations in those courses in which he has made a grade below passing, and if he receives a grade of passing in those courses with an average sufficient to make his cumulative average not less than *C*, he will be reinstated.

A student not subject to exclusion under the foregoing rule who at any time fails to maintain a cumulative average of at least *C* will be

placed on probation. A student on probation may at the discretion of the Dean be required to reduce his program of study. If a student on probation does not, by the end of the second semester following that in which his average has fallen below *C*, receive grades sufficient to give him a cumulative average of at least *C*, he will be excluded.

The cumulative average of a student includes all the grades in all the courses taken while he is in the Law School as a candidate for a particular degree. When a course is repeated or a reexamination is taken, both the first grade and the subsequent grade or grades are counted in the cumulative average.

In special cases in which a student who has been excluded can clearly demonstrate that his low grades were due to special circumstances beyond his control and that he has the capacity to pursue the study of law with a definite likelihood of success, such student may be readmitted by the Faculty subject to such conditions as the Faculty may impose.

**Candidates for Graduate Degrees.**—A candidate for one of the graduate degrees whose work is not satisfactory in the opinion of the Faculty, taking into consideration the requirements and standards for the degree, may, by action of the Faculty, be excluded at the end of the semester for which he is currently registered.

**Unclassified Students.**—An unclassified student whose work is not satisfactory in the opinion of the Faculty may, by action of the Faculty, be excluded at the end of the semester for which he is currently registered.

#### CLASSIFICATION OF STUDENTS

Candidates for the degree of Bachelor of Laws are divided into classes on the completion of semester hours as follows: first year, one through twenty-eight; second year, twenty-nine through fifty-six; third year, fifty-seven or more.

#### RIGHT TO CHANGE RULES

The University and its various colleges, schools, and divisions reserve the right to modify or change requirements, rules, and fees. Such regulations shall go into force whenever the proper authorities may determine.

#### RIGHT TO DISMISS STUDENTS

The right is reserved by the University to dismiss or exclude any student from the University or from any class or classes, whenever, in the interest of the student or the University, the University Administration deems it advisable to do so.



## STUDENT LIFE

## LIVING ACCOMMODATIONS

*Women Students.*—The Hattie M. Strong Residence Hall provides single rooms at \$35 a month and double rooms at \$30 a month a person. Meals are served at the Student Union. Admission to the University does not include dormitory reservation. Applications for rooms should be made well in advance. Forms for application, together with detailed information, may be obtained from the Director of Activities for Women.

Girls under the age of twenty-one who are enrolled for six or more semester hours of academic work in the University and who are not living with their parents or relatives may live outside the dormitory only with the permission and approval of the Director of Activities for Women, upon receipt of written requests from parents. In no case will permission be granted for such girls to be domiciled outside the dormitory, except with persons approved by the Director of Activities for Women.

*Men Students.*—Welling Hall provides double room facilities for 102 students. Rooms rent for \$24 a month a person. Dining facilities are available to all residents. Meals are also served at the Student Union. Application forms for room reservation may be obtained from the Director of Activities for Men, Building R, 2017 H Street NW.

Information concerning private rooming and boarding facilities near the University, for women students twenty-one years of age or older and for men students, may be obtained at the Housing Office. The reservation of rooms in private houses must be made by students.

## PLACEMENT

The University Placement Office, 2114 G Street NW., provides assistance to students seeking full- and part-time employment. This office maintains a registry of positions locally and nationally available and refers qualified applicants for consideration. Information is also available on Civil Service examinations.

The Law School takes a continuing interest in the placement of its graduates and maintains a placement service for that purpose. The Dean, the Faculty, and the University Placement Office cooperate in collecting information from alumni of the Law School, law firms, and government agencies concerning opportunities for legal positions throughout the country. Students and recent graduates are invited to discuss their placement problems with the Secretary of the Law School.

## HEALTH ADMINISTRATION

The University maintains a health service that is primarily diagnostic in its intent. For medical emergencies and health consultations there is,

on the Campus, a Student Health Clinic open from 9:00 A.M. to 5:00 P.M., with physician and nurse in attendance. There is also a rest room for women, with a graduate nurse in charge.

Medical privileges include: (1) the physical examination of every student entering from secondary school; (2) three visits by the University physician or surgeon, office or residence (District of Columbia), in any one illness, exclusive of a specialist, surgical operation, laboratory, or X-ray examination; (3) hospitalization, including board and nursing in the University Hospital for not more than one week during any twelve month period—the necessity to be determined by the Director of Health Administration. The duration of hospitalization period (maximum, one week) is also to be determined by the Director of Health Administration.

This medical benefit does not apply to illness or disability incurred previous to the University semester or prior to payment of tuition fees.

The student is allowed, if he so desires, to engage physicians and nurses of his own choice, but when he does so he will be responsible for the fees charged.

Rules: (1) The Director of Health Administration is empowered to limit or deny the medical benefits where, in his discretion, a student has, by his misconduct or breach of the rules of the University, made himself ineligible; (2) the Director of Health Administration has authority to determine the necessity and length of hospitalization; (3) a student who has severed his connection with the University is ineligible for medical benefits; (4) a student intending to train for an athletic team is required to pass a thorough examination at the beginning of each semester; (5) the above regulations apply also during the summer sessions of the University.

The University is not responsible for injuries received in intercollegiate or intra-mural games, or in any of the activities of the departments of physical education.

### THE DEGREES OF BACHELOR OF LAWS AND JURIS DOCTOR

The programs of study leading to the degrees of Bachelor of Laws and Juris Doctor are addressed to the development and application of legal principles, skills, and ideals which are indispensable to the equipment of a lawyer for professional responsibility and leadership in modern society. They include, first and foremost, the traditional core of legal education, namely, the study of legal materials—judicial, statutory, and administrative—and instruction in the technique of their use. These programs include the study of the nature and purpose of law, the history of the Anglo-American legal system, and the history and standards of the legal profession; practice in the skills of legal research and legal

writing; elementary training in trial practice, and, through the medium of seminars, experience in group handling of legal problems.

#### REQUIREMENTS FOR THE DEGREES

##### BACHELOR OF LAWS

To be recommended for the degree of Bachelor of Laws (LL.B.) the student must have completed a residence period of not less than three academic years (four years for evening students) and eighty semester hours, with a cumulative average of at least *C*. At least one academic year of residence and twenty-eight semester hours are required of students admitted with advanced standing.

##### Juris Doctor

The degree of Juris Doctor (J.D.) is conferred as a recognition of the completion at the George Washington University Law School, with high rank, of the required program of study for the Bachelor's degree, including experience in research and legal authorship. To be recommended for this degree the student must have completed: (1) a residence period of not less than three academic years (four years for evening students); (2) eighty semester hours with a cumulative average of at least *B* including one of the following courses: Comparative Law, Jurisprudence, or one of the graduate seminars; and (3) one year of acceptable service on the board of student officers of *The George Washington Law Review*, election to which is subject to regulations laid down by the Faculty. All requirements for the degree must be completed at this Law School.

##### Honors

The degree of Bachelor of Laws or of Juris Doctor "with distinction" will be awarded students who obtain a cumulative average of *A*.

#### CURRICULUM

*Required and Elective Courses*.—A program of required and elective courses has been developed in order to assure coverage of the basic courses as well as to allow a degree of flexibility to meet the diverse interests of students. All first-year courses, three second-year courses, and one third-year course are required leaving a total of thirty-eight hours of electives. In general, second-year students are restricted to second-year electives but in appropriate cases the taking of third-year electives will be approved. Similarly, specially qualified third-year students may secure approval to take graduate courses and research in public law.



*Practice and Trial Practice Court.*—Classroom instruction is conducted in pleading and procedure, trial and appellate practice, and evidence. This instruction includes grounding in the principles of the Federal Rules of Civil Procedure and the Federal Rules of Criminal Procedure. In addition, each senior student is required to participate in the work of the Trial Practice Court, which includes the trying of cases as junior counsel and as senior counsel. A special section of the court is devoted exclusively to the trial of patent cases. Experience in preparing and arguing appellate court cases is available through the Case Clinic Competition.

*Patent Law.*—Students interested in patent law should take the following group of courses: Unfair Trade Practices, Substantive Patent Law, Patent Office Practice, Patent Trial Practice Court, Federal Anti-Trust Laws, and Trade Regulation Seminar.

*Curriculum.*—Following is the curriculum for students beginning in the fall semester. Adjustments are made to meet the needs of students beginning in the spring semester and in the summer.

# Morning Division

## FIRST YEAR

FALL SEMESTER	Semester Hours	SPRING SEMESTER	Semester Hours
CONSTITUTION I	2	Agency	2
Legal Method and Legal Systems	4	Constitutional Law	4
Personal Property	2	Contracts I	2
Torts	4	Contracts II	4
		Criminal Law and Procedure	2
Total	14	Real Property	2
		Total	14

## SECOND YEAR

FALL SEMESTER	Semester Hours	SPRING SEMESTER	Semester Hours
Civil Procedure	4	Copyrights	2
Electives	10	Evidence	4
		Electives	8
Total	14	Total	14

## THIRD YEAR

FALL SEMESTER	Semester Hours	SPRING SEMESTER	Semester Hours
Total Practice Court	2	Total Practice Court	2
Electives	10	Electives	10
Total	12	Total	12

## Evening Division

## FIRST YEAR

FALL SEMESTER	Semester Hours	SPRING SEMESTER	Semester Hours
Contracts I .....	4	Contracts II .....	2
Legal Method and Legal Systems ..	4	Contract Law and Procedure ..	4
Personal Property .....	2	Tests .....	4
Total .....	10	Total .....	10

## SECOND YEAR

FALL SEMESTER	Semester Hours	SPRING SEMESTER	Semester Hours
Agency .....	2	Constitutional Law .....	4
Civil Procedure .....	4	Constitutions .....	2
Real Property .....	2	Electives .....	4
Electives .....	2	Total .....	10
Total .....	10		

## THIRD YEAR

FALL SEMESTER	Semester Hours	SPRING SEMESTER	Semester Hours
Electives .....	10	Evidence .....	4
Total .....	10	Electives .....	6
		Total .....	10

## FOURTH YEAR

FALL SEMESTER	Semester Hours	SPRING SEMESTER	Semester Hours
Trial Practice Court .....	2	Trial Practice Court .....	2
Electives .....	8	Electives .....	8
Total .....	10	Total .....	10

## GRADUATE PROGRAM

## DEGREES OF MASTER OF LAWS AND DOCTOR OF JURIDICAL SCIENCE

The administration of justice under law is a matter so vast and complex that some graduates feel the need for further study in order to broaden and ~~increase~~ <sup>deepen</sup> their understanding of the law. Others wish to extend their study into rapidly developing specialized fields. Graduate instruction, leading to the degree of Master of Laws, is therefore offered to enable qualified students to attain one or both of these objectives.

The degree of Doctor of Juridical Science is offered for selected stu-

dents whose aim is to extend still further their studies by pursuing original research in law.

Graduate work is available to evening as well as morning students in order that lawyers in private practice and in government service may engage in advanced study or in original research.

#### PROGRAMS OF STUDY FOR FOREIGN LAWYERS

Two programs of study are provided to meet the needs of lawyers who come from countries whose legal systems are not based on the English law. For such lawyers, whose aim is to acquire an understanding of our system so that they may work intelligently with its materials and practitioners after returning to their own countries, there is available the degree of **Master of Comparative Law**. For foreign lawyers, however, who wish to practice in a common law jurisdiction there is available the degree of **Master of Comparative Law (American Practice)** with an appropriate program of study. With respect to both programs, the students are not assigned to special classes but work in association with the other students in the regular courses, each student's program being adapted to his individual needs.

#### NON-DEGREE STUDY: CONTINUING LEGAL EDUCATION

As a result of changes and expansion in various fields of the law many lawyers pursue graduate study in order to keep abreast of current developments. Consequently, an important part of the graduate program is to provide for members of the bar not desirous of becoming degree candidates. The offerings in the field of governmental regulation provide opportunities for specialization. Although third year and graduate courses are particularly suitable, first year and second year courses may be taken in appropriate cases. Members of the bar taking graduate work in this way register as unclassified students or as continuing legal education students.

#### RESEARCH IN PUBLIC LAW

Research in public law is conducted under the supervision of members of the Faculty. The purpose of this research is to furnish means for training specialists in public law, either as government lawyers or as lawyers representing individuals or corporations in cases in which the Government is a party, and to assist in the analysis, clarification, formulation, and improvement of public law, substantive and procedural.

Candidates for the graduate degrees in the Law School and specially qualified seniors may pursue this work.



## REQUIREMENTS FOR THE DEGREES

### MASTER OF LAWS

To be recommended for the degree of Master of Laws (LL.M.) the student must have completed a residence period of not less than two semesters. Such residence should normally be continuous. All requirements for the degree must be completed in this Law School and in a period not exceeding two years after registration for work for the degree. The student must have completed, with a minimum average of *B*, twenty semester hours in courses listed in the law curriculum as graduate courses except that in appropriate cases third year courses may be approved for inclusion in the program of study if not previously taken.

### MASTER OF COMPARATIVE LAW

The degree of Master of Comparative Law (M.Comp.L.) is for foreign students who intend to return to their countries. To be recommended for this degree the student must have completed a residence period of not less than one academic year. He must have completed satisfactorily twenty four semester hours in approved courses in the curriculum of the Law School or of such other departments of the University as the Faculty of the Law School shall approve.

### MASTER OF COMPARATIVE LAW (AMERICAN PRACTICE)

The degree of Master of Comparative Law, American Practice (M.Comp.L.(Am.Prac.)) is for foreign students who intend to remain in this country. To be recommended for this degree the student must have completed a residence period of not less than one academic year. He must have completed twenty eight semester hours in approved courses in the curriculum of the Law School with a cumulative average of at least *C*.

### DOCTOR OF JURIDICAL SCIENCE

To be recommended for the degree of Doctor of Juridical Science (S.J.D.) the student must have completed a residence period of not less than one academic year. He must have pursued a course of study and research designated by his consultative committee and approved by the Committee on Graduate Studies. At the conclusion of his first year of residence, or at such other time as the Committee on Graduate Studies may set, the candidate must pass an oral examination in those fields of study selected by the consultative committee. This examination shall be conducted by the consultative committee and such other members of the Faculty and qualified experts from other research institutions as may be selected by the Committee on Graduate Studies.

Not later than the date specified in the University calendar the candidate must submit to the Dean one typewritten original and two legible and complete carbon copies of his dissertation in its final form. The dissertation must contain a summary of from 2,500 to 3,000 words inserted as an appendix. An additional original typewritten copy of this summary must be submitted for publication. To be acceptable the dissertation must, in the opinion of the examining committee, constitute a substantial contribution to the field of law concerned and be suitable for publication. Additional information will be supplied by the Chairman of the Committee on Graduate Studies.

The summaries of accepted dissertations will be printed in a volume forming a number of the University *BULLETIN*. The successful candidate for the doctorate is required, before receiving his degree, to pay a fee to cover the expense of printing the summary of his dissertation.

### SUMMER TERM

A term of two sessions, with morning and evening classes, is offered in the summer. Beginning students may start their studies in the first session only; continuing students and transfer students may register for either or both sessions.

The summer term is shorter than a semester of the academic year; and, as a consequence, a student must attend two and one-half summer terms to receive residence for one academic year or attend one and one-half summer terms to receive residence for a semester.

A maximum of six semester hours may be taken each session by morning students. Such students will receive two-fifths of a term of residence credit upon the completion of four or six semester hours in one session, and will receive four-fifths of a term of residence credit upon completion of eight or more semester hours in two sessions. A maximum of four semester hours may be taken each session by evening students. Such students will receive three-fifths of a term of residence credit upon the completion of four semester hours in one session, and will receive six-fifths of a term of residence credit upon the completion of six or eight semester hours in two sessions.

Summer students planning to take the New York bar examination must register at the beginning of the term for both sessions and must complete both.

COURSES OF INSTRUCTION





## COURSES OF INSTRUCTION

The courses of instruction listed below are subject to change. The University reserves the right to withdraw any course announced.

First-year courses are numbered from 100 to 200; second-year courses, from 201 to 300; third-year courses, from 301 to 400; and graduate courses, from 401 to 500.

The number of hours of credit given for the satisfactory completion of a course is indicated in parentheses after the name of the course. Thus, a Year course giving two hours of credit each semester is marked (2-2), and a semester course giving two hours of credit is marked (2).

Morning classes begin at 9:15 A.M. Evening classes begin at 5:30 P.M.

FIRST YEAR

- [illegible]

135 *Legal Method and Legal System* (4) Fryer, Benson, Davison, Merrifield, Walburn, Burke

Fall—morning and evening; spring—morning and evening, summer 1957.

Introduction to substantive and procedural law dealing with basic concepts; training in method and technique of legal law and legislation; some modern case methods; treatment of law being used in legal writing; importance of litigation in legal, social, economic and use of judgments under direction of some models; law of the case; and its relation to development of Anglo-American legal systems; recognition of individual and law, strong enforcement of ethical standards.

145 *Personal Property* (2) Fryer, Dixon, Mallison

Fall—morning and evening; spring—morning and evening, summer 1957.

Concepts of property, including interests created by bailment, liens, and policies; methods of acquiring ownership.

150 *Real Property* (2) Benson

Fall—evening; spring—morning, summer 1957.

Historical background of the law of estates and conveyances; freehold estates, nonfreehold estates.

160 *Torts* (4) Merrifield, Walburn, Garrett

Fall—morning; spring—evening.

Liability for harm to persons or tangible things, defamation and invasion of privacy.

SECOND YEAR

200 *Administrative Law* (4) Davison

Spring—morning and evening; summer 1957.

The position of the administrative process in the operation of government; including the status of administrative personnel, administrative law, the federal territory of administration, state, federal, and local government—continuity as relative to federal administrative process.

225 *Brief Writing and Oral Argument* (2) Burke

Fall—evening.

Exposition and study of the basic techniques of written and oral legal argumentation. Daily practice will be required to write on a case report a brief presenting convincing facts on the given issues of fact and law.



- 210 *Business Associations* (4) Weaver  
 Spring—morning and evening, summer 1957.  
 Contrast of the partnership and corporation as alternative forms of organization, ownership, partnerships and corporations—formation, initial contributions, share structure, problems of operation, relations between partners, role of shareholders, directors, officers, control devices, distributions to owners, minority representation, dissolution and termination.
- 215 *Civil Procedure* (4) Walburn, Burke  
 Fall—morning and evening, summer 1957.  
 Pleadings, discovery, motions, forms of trial and related post-trial issues. Emphasis is on Federal Rules of Civil Procedure and other modern codes.
- 219 *Commercial Paper* (4) Orentlicher  
 Fall—morning and evening, summer 1957.  
 Bills of exchange, promissory notes and checks, especially under the Negotiable Instruments Law.
- 224 *Commercial Transactions* (4) Orentlicher  
 Spring—morning and evening.  
 The law relating to the sale and distribution of goods, and to the security transactions arising out of this connection, with particular attention to the effect of security laws.
- 230 *Conveyances* (2) Walburn  
 Spring—morning and evening.  
 Land contracts, mortgages, leases, easements, profits, covenants, and options, servitudes, adverse possession and adverse title.
- 235 *Domestic Relations* (2) Mallison  
 Fall—morning and evening, summer 1957.  
 Marriage, annulment, and divorce, adoption and custody of children, domestic violence.
- 240 *Evidence* (4) Fryer  
 Spring—morning and evening, summer 1957.  
 Function of jury and jury qualification and examination of witnesses, opening, testimony and exhibits, evidence, proof of writings, evaluation of the hearsay rule.
- 243 *Federal Jurisdiction* (2) Cooper  
 Fall—morning and evening.  
 Constitutional and statutory bases of federal courts, venue arising under the laws and the Constitution, diversity of citizenship, practice.

violent against removal procedure and jurisdiction, limitations on and civil disobedience, state and federal conflicts, substantive law applied by federal courts.

248 *Future Interests* (2)

Benson

Fall—evening; spring—morning, summer 1937.

Future interests at common law and under modern statutes; construction of limitations; powers of alienation; rule against perpetuities.

251 *Insurance* (2)

Fall—evening.

The insurance contract in life, property, and other risks.

254 *International Law* (4)

Murdock, Mallon

Fall—evening; spring—morning.

The basic course. General survey of subjects and phases of study, law of war and peace, including nationality law, international copyright, settlement of disputes, League of Nations and World Court, study of major branches of International Law.

259 *Labor Law* (4)

Merrifield

Spring—evening and evening.

Law governing labor-management relations, organization and representation of employees, regulation of business unions, adjustment of industrial bargaining agreements, labor laws and union relations.

263 *Legal Accounting* (2)

Driscoll

Fall—evening and evening.

A study of elementary accounting principles and techniques, nature and accounting principles in legal problems.

270 *Legislation* (2)

Mallon

Fall—evening, summer 1937.

The legislative process, with particular emphasis on the procedure in federal and state governments, legislative organization and procedure, executive interpretation.

274 *Taxation—Federal Estate and Gift* (2)

Driscoll

Fall—evening and evening.

Special problems in federal estate and gift taxation, with consideration of present state alternative tax problems.

- 276 *Taxation—Federal Income* (4) Fey, Driscoll  
Fall—evening; spring—morning.  
A study of the federal income tax, including construction of statutes, practice and procedure, and legislative policy.
- 285 *Trusts and Estates* (4) Weaver  
Fall—morning and evening.  
Possibilities of execution of wills; problems of construction, revocation, intestacy, trusts on testamentary power, testamentary succession. Creation of trusts, inter vivos and testamentary; administration of decedent's estate and trust estates.
- 295 *Unfair Trade Practices* (4) Weston  
Fall—morning and evening.  
Unfair trade practices at common law and under statute; trade-marks, trade names; copyright law; misappropriation of ideas; protection of consumers and consumers' unions; false advertising under Federal Trade Commission Act; resale price maintenance under state Fair Trade Acts; miscellaneous business practices.

## THIRD YEAR

- 300 *Admiralty* (2) Davis  
Spring—evening.  
Federal and state jurisdiction; jurisdiction over waters, craft, contracts, torts, crimes, in maritime matters, etc.; laws applicable to maritime workers and maritime law.
- 373 *Aviation Law* (2) ———  
Fall—evening.  
Procedure before Civil Aeronautics Board; legal problems arising in connection with air transportation and airports; international conventions and organizations.
- 327 *Comparative Law* (4) Murdock  
Fall—evening.  
The Civil Law Society's annual introduction to foreign law as exemplified by Roman Law and the modern French Law; comparative study of administration of justice; legal instructions; and methods for international law practice and working with foreign lawyers.
- 309 *Conflict of Laws* (4) Collier, Dixon  
Fall—morning and evening; summer 1957.  
Study of cases involving foreign elements; principles of jurisdiction and limitations upon its exercise; procedure, torts, workmen's com-



probation, contracts, property, family law, administration of estate, business combinations.

313 *Constitutional Interpretations* (2)

Collier

Not offered 1957-58

Advanced course in constitutional law. The Constitution and constitutional structure; division of federal government; separation of powers; implied limitations on legislative power; and significance of "due process" in current constitutional developments. Introduction to comparative constitutions; law with studies in the constitutional law in several states of the Union.

318 *Creditor's Rights* (4)

Summer 1957.

Review of secured creditors, judgments, fraudulent conveyances, creditors' agreements, equity and statutory remedies, and bankruptcy. The general approach is that of law administration.

321-22 *Current Decisions* (2-2)

Weston

Academic year—morning and evening

Required of, and limited to, members of the student staff of the Law Review.

330 *Federal Anti-Trust Laws* (4)

Weston

Spring—evening

Restraints of trade 41, Sherman Law and under Sherman Antitrust Act of 1890. Federal Trade Commission and Clayton Act by monopoly, restraints, exclusive agreements, trade associations, exclusive dealing agreements, tie-in sales, and trade boycotts, cartels and trusts under antitrust laws.

335 *Jurisprudence* (2)

Collier

Philosophy, Spring—evening

History of jurisprudence; schools of thought; particularly the late nineteenth century, which recognized independence, thought of law, the notion of law, law and morality law and the state; the nature and subject matter of law; sources and forms of law; the traditional sources; sources of general legal concepts.

339 *Labour Arbitration* (3)

Marshall

Spring—evening

Labour arbitration and collective bargaining; role of the court in mediation and administration of voluntary labor agreements; problems, procedures and techniques found in labor arbitration.

- 341 *Labor Standards and Social Security Legislation* (2) Merrifield

1958-59 and alternate years.

Local problems arising under federal and state statutes dealing with labor standards and social security. Particular emphasis is placed upon the regulation of wages and hours, workmen's compensation and insurance against unemployment and old age.

- 345 *Legislative Drafting* (2) Zinn

Fall—evening

Advanced instruction and practice in legislative drafting.

- 349 *Local Government Law* (2) Mallisen

Fall—evening

Types and structure of city, county, and local governmental units; intergovernmental relations; regional development and change; local government; community planning and development.

- 355 *Mortgages* (2) Orentlicher

Summer 1957

Security interests in real property, their creation, transfer, enforceability, and extinguishment.

- 359 *Patent Law I\** (2) Rebillard

Fall—evening

Origin and nature of patents, trademarks and copyrights; patentable subject matter; and granting of patents; conditions precedent to grant of patent.

- 360 *Patent Law II* (2) Harris

Spring—evening

Enforcement and protection of patents; government's exclusive jurisdiction of patent rights; judicial review; and other features of patents.

- 302 *Patent Office Practice\** (2) Rose

Spring—evening

Rules and practice, appeals and administrative procedure.

- 305/306 *Patent Trial Practice Courts\** (2-2) Genesee, Brown

Autumn—evening

Practice before the United States Court of Customs and Patent Appeals and the Federal courts. Emphasis on litigation procedure before the courts.

\* These are classes which have been run and law students are encouraged to take them in the fall semester and law and law-related students to take them in the spring semester.

including Law 215 and 240. Law 359, which is also required, may be taken concurrently.

This course may be elected instead of Law 385-86 to satisfy the Trial Practice Court requirement.

375 *Public Utilities* (2)

Fryer

Spring-evening.

Regulation by federal, state, and municipal authorities concerned with heating, power, service, and property, with emphasis on federal regulation of interstate operations; judicial review.

376 *Restitution* (2)

Burke, Orentlicher

Spring-morning and evening; summer 1957.

Remedies at law and in equity for restitution of benefits conferred, especially as based on the concept of unjust enrichment.

385 *Suretyship* (2)

Orentlicher

Summer 1957.

The law of suretyship, especially in the context of commercial loan and commercial and financial practice, with attention also to internal and commercial suretyship relations and the effect of suretyship principles on the solution of legal problems generally.

385-86 *Trial Practice*

Kirkland, Edgerton, Myers, Jackson.

Court (2-2) Herrick, Mink, Walsh, Kendrick, Sinker

Academic year-morning and evening.

Title of assigned cases; trial action and technique; general and court room procedure pursuant to Federal Rules.

To be taken in the same year. Prerequisite: two-year general course, including Law 215 and 240.

391 *World Law* (2)

Not offered 1957-58.

International transactions; the legal aspects of the United Nations.

#### GRADUATE COURSES

421 *Administrative Law Seminar* (2)

Davison

Fall-evening.

Group study of specific problems in administrative law.

408 *Constitutional Law Seminar* (2)

Not offered 1957-58.

Group study of contemporary problems in constitutional law.



412 *Control and Use of Atomic Energy* (2)

Mayo

Fall—evening

Various legal problems involved in the control and use of atomic energy will be examined, including the Atomic Energy Act; the policy motivating the present government attitude; the security problem of safeguarding atomic military information; the implications in non-military industrial control and use; and legal means of protecting national interests against the possible consequences of atomic warfare.

416 *Criminal Practice and Administration* (2)

Corper

Spring—as arranged.

Group study of the fundamental aspects of criminal procedure with special reference to practical values the *Lawyer of Columbia* and federal courts; the law of arrest, search and seizure, self-incrimination, the function of the preliminary examination and grand jury, sufficiency of indictments, trial procedure, and the order of pleas and motions.

426 *Estate Planning Seminar* (2)

Weaver

Spring—evening

Group study of the effective disposition of wealth, inter vivos and testamentary gifts, conservation for family future use, use of insurance, tax and administrative problems, business interests, pension and profit-sharing arrangements.

424 *Evidence and Trial's Seminar* (2)

Fryer

1948-49 and alternate years

Study of selected problems involving presentation of documentary proof and expert testimony in connection with the review made by the District Judge of Evidence and court developments in the field of federal evidence.

428 *Food and Drug Law* (2)

Goodrich, Kleinfeld

Spring—evening

A lecture and discussion course dealing with the Federal Food, Drug, and Cosmetic Act with governmental control considered. Both government and industry viewpoints are considered.

431 *Government Contracts I* (2)

McIntire

Fall—evening

A discussion of the legal power of the Federal Government to enter into contracts; the terms and construction of such contracts; contract and law in federal government; government procurement; bidding administration and legislative policy and procedures; forms of contract; contract clauses; advertised bid procedure; problems regarding contract modification of contracts; remedies on contract claims.

432 *Government Contracts II* (2) McIntire

Spring—evening

Several problems in government contracts, including adjustments and relief procedure for protesting claims under government contracts; attempts at cost, cost-plus, or profit control; termination.

437 *International—Comparative Law Seminar* (2) Murdock

Fall—evening

Group study of contemporary problems in international and comparative law.

442 *Labor Law Sessions* (2) Merrifield

Spring—evening

Group study of contemporary problems in labor law.

446 *Law of Money and Monetary Obligations* (2) Dachs

Not offered 1957-58.

Introductory survey of the provisions of public law by which money is administered; relative importance to the Federal Reserve System; the legal character of money and its monetary obligations; legal tender; the "unit of account" rule and its variations; protective silver; gold, commodity, and index currency. Particular emphasis will be given to the law relating to foreign currency.

449 *Law of the Arab East* (2) Locksby

Fall—evening

A study of the law of the Arab countries, including the legal system of the Islamic law; an analysis of the present law codes and an investigation of the Western influence on the law of the Arab countries.

455 *Legal Problems in Modern Methods of Warfare* (2) Mallison

Fall—evening

The contemporary international law of war; legal aspects of modern methods of warfare (economic, political, psychological, and military); treatment of prisoners; the special problems of atomic, biological, and chemical weapons; war crimes.

459 *Military Law and Jurisdiction* (2)

Not offered 1957-58.

Sources of military jurisdiction; military law proper; military and civil jurisdiction; and procedure before military and civil courts; military government; martial law; laws of war and treatment of prisoners.

473 *Regulation of Communication Media* (2)

Mayr

Folio—exam.

A comparison of the legal structure relating to regulatory functions in the domains of mass communication (i.e., newspapers, radio, television, and cinematograph), analysis of the operational structure of the mass media and the groups of interest involved in government, public associations, and various community groups; appraisal of the comparative utility of various regulatory techniques for implementing policies affecting mass media; critical appraisal will be placed on the contents of the French Communication Commission.

474 *Regulation of Securities and Securities Markets* (2)

Kroll

1948-52 and abstracts only.

A study of some and related laws governing the offering and distribution of securities in the United States, for securities issues and sales, the provision of securities markets, and the effect and influence of securities under such systems. Securities markets will be covered in detail as discussed by the Securities and Exchange Commission.

475 *Research in Patent, Trade-Mark, and Copyright Law* (2)

Harris

Folio—exam; group—no abstract.

Registration is limited to students who have taken Patent Law I and II and certain courses including, at a minimum, Trade-Mark Law and who have at least a B average. A request in writing, with a proposed outline of the topic of research, must be submitted to the Dean at least one month prior to registration day. Registration is necessary for one semester only and the work must be completed within the semester.

476 *Research in Public Law* (2)

The Staff

Folio—exam; group—no abstract.

Registration is limited to students who have previously had previous or comparable courses in the field of the proposed research and who have at least a B average. A request in writing, with a proposed outline of the topic of research, must be submitted to the Dean at least one month prior to registration day. Registration is necessary for one semester only and the work must be completed within the semester.

477 *Taxation—Corporate* (2)

Dissell

Folio—exam.

One law and one Internal Revenue Code provisions applicable to corporations; analysis of corporate distributions, reorganizations, stock, recapitalizations and mergers; eligible corporations, corporate liquidations, value of business enterprises; personal holding companies; accumulated earnings tax and carryovers.



- 478 *Taxation of Foreign Income Seminar* (2) Driscoll  
Not offered 1957-58  
Group study of methods of taxing income received from abroad and taxation of nonresident aliens; analysis of foreign income taxation and estate tax law; treatment, consideration of legislative proposals for taxation of foreign income.
- 480 *Taxation—Oil and Gas* (2) Driscoll  
Symposium  
A study of the 1954 law relating to percentage depletion, table and taxation of income to oil and gas producers; legal aspects of financing methods—oil and gas operations; analysis of percentage depletion provisions of the 1954 Internal Revenue Code to oil and gas activities.
- 481 *Taxation Seminar* (2) Driscoll  
Lecture—evening  
Group study of special problems and recent developments in taxation.
- 492 *Trade Regulation Seminar* (2) Weston  
Symposium  
Group study of current problems relating to unfair trade practices and unfair trade laws.
- 498 *Urban Redevelopment* (2) Osoff  
Lecture—evening  
Solving problems in urban redevelopment and housing with particular emphasis on programs under current federal and state legislation.

# DEGREES CONFERRED

## BACHELOR OF LAWS

JUNE 6, 1956

David LeRoy Adams A.B. 1939, Central College	MI	John Miller Emerson B.S. 1936, Florida Southern College	N.C.
Arthur Isaac Auerbach B.S. 1934, 1940, Georgetown University	Va.	Albert Gertler B.S.E. 1935, College of the City of New York	Va.
Edward C. Auer A.B. 1939, Georgetown College	Mo.	John William Jones B.S. 1931, Richmond College	Va.
Marvin Louis Berman A.B. 1935, The George Washington University	Mo.	A.M. 1934, The George Washington University	
Marvin Berman B.S. 1935, The George Washington University	N.Y.	Harvey Robert Rubin A.B. 1935, South University of Iowa	N.Y.
Frederick Thomas Berman A.B. 1935, University of Utah	Utah	Frank Rex Morris A.B. 1932, Middlebury College	Ohio
Edward Patrick Connel B.S. 1934, University of Missouri	Mo.	John Rothbard A.B. 1935, Princeton University	Calif.
Emory Louis Cooper, Jr. A.B. 1935, The George Washington University	N.Y.	Charles William Higgins B.S. 1933, Hartford College	Mo.
Israel Hyman Oliner B.S. 1935, 1940, Georgetown University	Pa.	Charles Archibald Linton, Jr. A.B. 1935, The George Washington University	D.C.
Frederic Marvin Clarkson B.S. 1935, Cornell University	Va.	Samuel Herbert Kell B.S. 1935, University of Maryland	Mo.
John Paul Galt B.S. 1935, Alabama Polytechnic Institute	Mo.	Robert Ross Clark Keshell B.S. 1935, Pennsylvania State University	Pa.
J. Wendell Galt B.S. 1935, Northwestern University	D.C.	Thomas Patrick Kell B.S. 1935, United States Military Academy	D.C.
M.H.A. 1935, Harvard University		Thomas Ernest Kishel B.S.E. 1935, University of Missouri	Mich.
William H. Lewis A.B. 1935, Bowdoin College	Va.	Earl Ernest Kottmeyer A.B. 1935, Bryn Mawr College	Ohio
Don Devlin Mize A.B. 1935, University of North Carolina	N.C.	Earl Frederick Lane A.B. 1935, Johns Hopkins College	Inda.
Roger (Dickens) Ellison, Jr. A.B. 1935, University of Wisconsin	Mo.	Vernon Hamilton LeVetion, Jr. A.B. 1935, Ohio University	Mo.
A.B. 1935, Ph.D. 1947, Syracuse University		Alan Raymond Linsley B.S. 1935, United States Merchant Marine Academy	Mo.
Thomas William O'Leary A.B. 1935, Municipal University of Warsaw	Va.	W.E. 1935, Georgetown University	Mo.
William John O'Leary B.S. 1935, Marquette College	N.Y.	Thomas J. Lunt B.M.E. 1935, College of the City of New York	Mo.
Richard Basil O'Leary B.S. 1935, Vassar University	D.C.	Joseph Anthony Marone, Jr. A.B. 1935, Buffalo Young University	Calif.
William Louis O'Leary, Jr. B.S. 1935, South Carolina State College	N.C.	James Edwin Marone B.S. 1935, Deen College	Pa.
William Louis O'Leary, Jr. B.S. 1935, South Carolina State College	Pa.	William Leonard McAndrew B.S. 1935, Pennsylvania State University	Pa.
William Louis O'Leary, Jr. B.S. 1935, South Carolina State College	Pa.	Robert Philip Martin B.S. 1935, Virginia Polytechnic Institute	Va.
William Louis O'Leary, Jr. B.S. 1935, South Carolina State College	Pa.	Correll Edward McMillan, Jr. B.S. 1935, Iowa State College	Iowa
William Louis O'Leary, Jr. B.S. 1935, South Carolina State College	Pa.	James V. M. McMillan B.S. 1935, The George Washington University	Pa.
William Louis O'Leary, Jr. B.S. 1935, South Carolina State College	Pa.	Wallace Chester Miller A.B. 1935, Pennsylvania State University	Pa.

Miles Carl Minkovsky	I.	George Edward Strong, Jr.	Vo
B.S. 1918, M.F. 1940, University of Michigan		B.S. 1948, College of the Holy Cross	Me
Henry McDonald Moore	S.C.	Henry Thomas Rice, Jr.	Me
A.B. 1911, The Citadel		B.S. 1911, University of Maryland	Me
James Robert Mayhew	D.C.	Joanne Slye Suk	Me
B.S. 1927, The George Washington University		A.B. 1912, University of Maryland	Me
Lawrence Marshall Murphy	D.C.	Joseph W. Supt	Me
A.B. 1914, The George Washington University		A.B. 1914, Yale University	Me
Harold Franklin Nottmann	Vo	Donald Joseph Smith	Me
A.B. 1927, The George Washington University		B.S. in Ch.E. 1920, Bucknell University	Me
Isidore William Paine	Me	James Donald Smith	Me
B.S. 1921, University of Utah		A.B. 1927, University of Illinois	Me
Joseph Gerald Rapp, Jr.	D.C.	A.M. 1944, Western Reserve University	Me
A.B. 1923, The George Washington University		James Henry Stone	Me
Roger Stanley Ray	I.	A.B. 1911, Mount Union College	Me
A.B. 1921, Franklin and Marshall College		Marion Lee Taylor	Me
Richard Martin Reimann	W.V.	A.B. 1921, A.M. 1924, New York University	Me
B.S. 1921, Mount College		William Oron Uckelein	Me
Thomas Russell Rice	W.V.	F.M.A. 1927, College of the City of New York	Me
A.B. 1921, West Virginia University		M.B. 1927, Romanian Paleontological Institute	Me
Max Oronio Riley	Me	One Robert Van Rensselaer	Me
A.B. 1920, University of California		A.B. 1921, A.M. 1924, The George Washington University	Me
Frederick David Robinson	N.Y.	James Van Hook	Me
B.S. 1921, University of Pennsylvania		A.B. 1921, New Jersey State Teachers College, Montclair	Me
Thomas Henry Rowland	R.I.	Edward William White	Me
A.B. 1921, Princeton College		B.S. 1920, United States Navy Academy	Me
Robert Lee Rowland	K.V.	George Washington Williams	Me
A.B. 1921, University of Nebraska		A.B. 1921, University of Pittsburgh	Me
Harold Arthur Sage-Wong	R.I.	Richard Williams White	Me
A.B. 1921, Princeton College		A.B. in Civil Eng. 1924, The George Washington University	Me
Samuel Samuel	Vo	James Brown White	Me
A.B. 1921, Western College		B.S. in C.E. 1921, Bucknell University	Me
Samuel Samuel	Vo		
A.B. 1921, University of Maryland			
Samuel Samuel	Vo		
B.S. 1921, Western Reserve College			

## October 20, 1929

Thomas Milton Anthony, Jr.	Me	John Francis Hoff	Me
A.B. 1921, American College		B.S. 1921, University of New York	Me
John Arthur Armstrong, Jr.	Me	Charles Herbert Lamb	Me
B.S. 1921, University of Maryland		B.S. 1921, University of Maryland	Me
James Lee	Me	Clifford Arnold Moore	Me
A.B. 1921, New York University		A.B. 1921, University of Maryland	Me
Harold William Loomis, Jr.	Me	William John Moore	Me
B.S. 1921, Mount Union College		A.B. 1921, University of Illinois	Me
Walter Edwin Crawford	Me	M.B.A. 1921, University of Illinois	Me
A.B. 1921, Western Michigan College of Education		Marion Lee Moore	Me
John Paul Cunningham	Me	A.B. 1921, University of New York	Me
B.S. 1921, Western Reserve University		Harold Wayne Moore	Me
Oscar George Faxon	W.V.	B.S. in M.E. 1921, Kansas State College of Agriculture and Applied Science	Me
A.B. 1921, West Virginia University		Frederick Robert Mott	Me
Paul Lee Faxon	Me	B.S. 1921, Bucknell University	Me
A.B. 1921, Indiana Valley College		Colin Bruce Palmer	Me
Frederick Clark Faxon	Me	A.B. 1921, The George Washington University	Me
A.B. 1921, St. Mary's College, Calif.		Alfred William Taylor	Me
Michael Martin Franklin	Me	A.B. 1921, A.M. 1924, The George Washington University	Me
B.S. in C.E. 1921, University of Michigan		John Henry Taylor	Me
Henry Lloyd Knight, Jr.	Vo	A.B. 1921, The George Washington University	Me
B.S. in B.E. 1921, Pacific University		A.B. 1921, The George Washington University	Me
Samuel Edward Loring	N.Y.	A.B. 1921, The George Washington University	Me
A.B. 1921, Case College		A.B. 1921, The George Washington University	Me



John W. Smith Phillips R.S. 1914, Yale University New Hampshire	NH	John W. Smith Phillips R.S. 1914, Yale University New Hampshire	Pa
Robert Lawrence Folger A.B. 1914, Springfield University Massachusetts	MA	Robert Lawrence Folger A.B. 1914, Springfield University Massachusetts	MA
Mary Thomas Putnam A.B. 1914, Duke University North Carolina	NC	Mary Thomas Putnam A.B. 1914, Duke University North Carolina	NC
Margaret Thomas Wright A.B. 1914, St. Albans College Vermont	NH	Margaret Thomas Wright A.B. 1914, St. Albans College Vermont	VT
James Judson Williams B.S. 1915, University of Maryland Maryland	MD	James Judson Williams B.S. 1915, University of Maryland Maryland	MD
Edith L. Smith A.B. 1915, Yale University Connecticut	CT	Edith L. Smith A.B. 1915, Yale University Connecticut	CT
Harriet L. Smith A.B. 1915, Columbia University New York	NY	Harriet L. Smith A.B. 1915, Columbia University New York	NY
John W. Smith Phillips R.S. 1915, Yale University New Hampshire	NH	John W. Smith Phillips R.S. 1915, Yale University New Hampshire	Pa

## BACHELOR OF LAWS IN NATIONAL UNIVERSITY

JUNE 10, 1956

Author	John H. Johnson	Editor	Robert Henry Johnson	Year	1964
Editor	Robert Henry Johnson	Editor	Robert Henry Johnson	Year	1964

## JURIS DOCTOR

JUNE 6, 1956

[illegible]

( ) OTHER 20, 1, 2, 3

[illegible]

## MASTER OF LAWS

JUNE 6, 1956

Joseph Chandler Burton	D.C.	Virginia Lee Rahn	D.C.
B.S. 1926, Alabama Polytechnic Institute		B.S. 1929, National University	
J.D. 1929, University of Illinois		Jack Earl Roberts	Am.
John Thomas Cattan University	Miss.	B.S. 1921, Brigham Young University	
A.B. 1929, LL.B. 1931, The George Washington University		J.D. 1931, The George Washington University	
Charles J. Felt	Mo.	Berkley Macanville Rathe	Va.
LL.B. 1929, University of Missouri		A.B. 1934, A.M. 1935, B.S. 3-1-3	
Nathan Clancy Fink	Mo.	1935, Syracuse University	
A.B. 1922, Amherst College		LL.B. 1935, The George Washington University	
LL.B. 1928, Harvard University		Thomas Clarke Scott	N.I.
Eugene Leslie Gibson	ME.	A.B. 1934, Harvard College	
B.S.L. 1948, LL.B. 1950, University of Missouri		LL.B. 1935, Columbia University	Tenn.
Dorcas Mabel Green	Iowa	Robert Edwin Stewart	
B.S. 1929, United States Military Academy		A.B. 1932, Virginia Military Institute	
LL.B. 1937, Yale University		LL.B. 1935, University of Texas	Va.
Edwin Deane Loomery	IL.	Henry George Weismann, Jr.	
A.B. 1929, Princeton College		B.S. 1930, Georgia Institute of Technology	
LL.B. 1931, Harvard University		LL.B. 1932, Emory University	
John Alexander McWhorter, Jr.	D.C.		
A.B. 1927, LL.B. 1929, Washington and Lee University			

OCTOBER 20, 1956

Ervin Ralph Crane, Jr.	Mass.	Arnold Charles Marmor	N.Y.
B.S. 1942, LL.B. 1946, University of Michigan		LL.B. 1944, The George Washington University	
J.D. 1949, The George Washington University		Ernest Joseph Pasich	Mass.
Howard William Clechman	N.Y.	LL.B. 1949, Boston University	
A.B. 1949, LL.B. 1951, Cornell University			

## MASTER OF LAWS IN NATIONAL UNIVERSITY

JUNE 6, 1956

Walter Warren Johnson	Va.
B.S. 1934, University of North Carolina	
LL.B. 1934, Columbia University	

## MASTER OF COMPARATIVE LAW

JUNE 6, 1956

George C. Servino	Philippines
LL.B. 1954, University of the Philippines	

## MASTER OF COMPARATIVE LAW

(American Practice)

JUNE 6, 1956

Harold G. Elliot	Va.
LL.B. 1954, Charles University, Prague	

OCTOBER 20, 1986

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1. 2. 3. 4.

### Part 2: Summary

1. 4. 1.

U. ALLEN, *Member of Technical Staff*  
 IBM University of Illinois Division

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4. 3

Dr. D. F. T. University of Pisa, Pisa



## STUDENTS REGISTERED IN THE LAW SCHOOL

SUMMER TERM 1951

FALL SIMILAR 1,32-57

[illegible]



Coffey, Charles Augustine	Va	Coffey, David	D.C.
A.B. 1918, Wake Forest		A.B. 1918, A.M. 1921, Marlborough College	
Coffin, John Joseph	Pa	Coffin, John, Jr.	Va
B.S. 1916, University of Pennsylvania		A.B. 1918, University of Pittsburgh	
Coffin, Joseph Albert	S.C.	Coffin, Perry James	Tl
B.S. 1920, University of South Carolina		B.S. in M.E. 1920, Northwestern University	
Coffman, Richard Lawrence	Mass	Coffman, Fred Samuel	Va
B.S. 1916, Georgetown University		B.S. in Chem. 1922, University of Virginia	
Coffman, Edward Leroy	D.C.	Coffin, William August	Va
B.S. in C.E. 1921, Johns Hopkins University of Technology		A.B. 1919, Yale University	
Coffman, James, Jr.	D.C.	Coffin, Allen Elmer	D.C.
B.S. in E.E. 1926, University of Illinois		B.S. 1922, Bowling Green State University	
Coffman, William Franklin	Ind	Coffin, James Wilson, Jr.	Mo
B.S. 1920, University of Nebraska		B.S. 1914, Marquette College	
Coffin, Thomas William	Il	Coffin, James Thomas	
B.S. in Mech. Eng. 1915, University of Missouri		B.P.S. 1916, M.S. 1923, Ohio State University	
Coffin, Thomas Yabell, Jr.	Ma	Coffin, James	Cal
A.B. 1912, University of Virginia		A.B. 1912, Harvard University	
Coffin, Ben W.	Mass	Coffin, John Donald	Va
A.B. 1911, Missouri State University		A.B. 1912, Wesleyan Methodist College	
Coffin, Jay M.	Pa	Coffin, John Thomas, Jr.	Mo
B.S. in E.E. 1926, University of Pennsylvania		B.S. 1922, University of Pennsylvania	
Coffin, Harold David	D.C.	Coffin, John	Pa
Coffin, John	N.Y.	Coffin, John	
B.S. 1920, College of the City of New York		Coffin, John A.	
Coffin, John Lewis, Jr.	A.I.	B.S. 1919, Johns University	
A.B. 1912, Vanderbilt University		Coffin, John Elmer	
A.M. 1916, Columbia University		B.S. 1922, Wayne Township College	
Coffin, John Ann	N.Y.	Coffin, Joseph Martin	Va
B.S. 1915, Harvard University		B.S. 1920, U.S. Naval Academy	
Coffin, William John	Va	Coffin, John	D.C.
A.B. 1916, The George Washington University		Coffin, John	
Coffin, Allen LeRoy	Va	A.B. 1916, The George Washington University	
B.S. 1916, Purdue University		Coffin, John Richard	Mo
Coffin, Morgan Stephen, Jr.	D.C.	B.S. 1916, Pennsylvania State College	
A.B. 1916, University of Maryland		Coffin, Charles William	N.Y.
Coffin, Perry	Il	A.B. 1916, Boston University	
B.S. 1916, Washington Washington University		Coffin, Edward Leroy	D.C.
Coffin, William	Ma	B.S. 1917, Washington College	
B.S. 1917, New York University		Coffin, John William	D.C.
Coffin, Edward John	N.Y.	A.B. 1916, New York University	
B.S. 1916, Yale University of New Haven		Coffin, Fred William	
Coffin, Peter John	D.C.	B.S. in E.E. 1921, Case Institute of Technology	
A.B. 1916, The George Washington University		Coffin, Edward Albert, Jr.	D.C.
Coffin, Charles Henry	N.H.	B.S. 1922, George Washington University	
B.S. 1916, University of New Hampshire		M.S. 1920, U.S. Naval Academy	
Coffin, John Joseph	D.C.	Coffin, John	Pa
A.B. 1916, The George Washington University		Coffin, John	
Coffin, Christopher Joseph	Pa	B.S. 1916, Pennsylvania State College	
B.S. 1916, U.S. Naval Academy		Coffin, John	Mo
Coffin, William Henry	Mo	B.S. 1916, Pennsylvania State University	
B.S. 1916, University of Maryland		Coffin, Thomas John, Jr.	D.C.
Coffin, John Daniel, Jr.	Va	A.B. 1916, University of Maryland	
B.S. 1916, The George Washington University		Coffin, Joseph Allen	
Coffin, Harry Richard	Va	A.B. 1916, University of Maryland	
A.B. 1916, University of Virginia		Coffin, John William	Mass
Coffin, Jay	Va	Coffin, John William, Jr.	
B.S. in M.E. 1921, Johns Hopkins College		B.S. in C.E. 1921, University of Michigan	
Coffin, John	Ind	Coffin, John	
B.S. 1916, The Naval Academy		Coffin, John	
Coffin, John	Ind	B.S. 1916, The George Washington University	
B.S. 1916, University of Tennessee		Coffin, John	
Coffin, John		B.S. 1916, Cornell University	





[illegible]

## F.

[illegible]





[illegible]





[illegible]

LeBaron, Edward Wayne, Jr.	ME	LeBaron, Thomas Albert	OH
A.B. 1929, College of the Pacific		A.B. 1929, Miami University	
Lee, David H. Olin	Hawaii	Lee, Carl George	Va
A.B. 1921, University of Hawaii		A.B. 1921, College of Wooster	
Leighton, George Joseph	ME	Leitch, Lee Clinton	Va
B.S. 1923, College of the City of New York		A.B. 1923, Wesleyan College	Hawaii
Leitch, Norman, Jr.	Calif	Leitch, John Hiram	
A.B. 1921, University of California		A.B. 1921, Yale University	Mo
Leitch, Russell Nathan	D.C.	Leitch, Allan M. Shaw	
A.B. 1921, New York University		B.S. 1926, University of Maryland	Mo
Leitch, Louis Robert	N.Y.	Leitch, Ian Anthony	
B.M.E. 1925, College of the City of New York		A.B. 1925, University of Missouri	Mo
Leitch, George Franklin	N.Y.	Leitch, John Thomas	
B.S. 1923, College of the City of New York		B.S. 1924, University of Maryland	N.Y.
Leitch, George Theodore	N.Y.	Leitch, Philip Eugene	
A.B. 1913, LL.B. 1914, University of Missouri		B.S. 1921, Columbia University	Calif
Leitch, Howard S.	N.Y.	Leitch, William Stanford	
A.B. 1925, LL.B. 1926, Cornell University		A.B. 1925, Pacific University	Mo
Leitch, Bruce Ernest	N.Y.	Leitch, James A.	
A.B. 1921, Duke University		A.B. 1921, A.M. 1926, University of California at Los Angeles	Va
Leitch, Harold	Va	Leitch, Carl Vernon	
B.S. 1924, U.C.L. 1924, Pacific University		A.B. 1924, West Virginia Wesleyan College	
Leitch, David Robert	Pa.	Leitch, Arthur Richard	Va
A.B. 1919, New York University		B.S. 1921, University of Wisconsin	
Leitch, Lawrence	Ill.		
B.S. 1921, Washington and Lee University			
Leitch, John J.	D.C.	Leitch, M. J.	Va
B.S. 1921, College of the City of New York		A.B. 1921, University of Vermont	Va
M.S. 1923, Kansas State College of Agriculture and Applied Science		McMann, Edmund James	
Leitch, Myra	D.C.	A.B. 1921, Indiana College	
University Department of Law 1919, University of Iowa, Iowa		McNair, George	Va
Leitch, Carl	Va	A.B. 1921, University of Wisconsin	
B.E.E. 1922, Rensselaer Polytechnic Institute		McNair, George Henry	
Leitch, James Thomas	Va	A.B. 1918, The George Washington University	
A.B. 1919, Randolph-Macon College		McNair, Richard Leo	Va
Leitch, Donald Joseph	Ohio	B.S. 1921, Indiana University	
B.S. 1919, Georgetown University		McNair, Ronald Paul	
Leitch, John	D.C.	A.B. 1919, Georgetown College	
Ph.D. 1921, Royal University of Naples, Italy		McNair, George Henry	
Leitch, Carl John, Jr.	Texas	McNair, George Henry	
A.B. 1917, LL.B. 1917, M.D. 1918, University of Minnesota		McNair, George Henry	
Leitch, Thomas Earlwood	Va	B.S. 1921, U.S. Military Academy	N.I.
LL.B. 1921, St. John's University, N.Y.		McNair, George Henry	
Leitch, Edward Oswald	D.C.	McNair, George Henry	
A.B. 1921, LL.B. 1922, New York University		McNair, George Henry	
Leitch, Norman, Jr.	D.C.	McNair, George Henry	
B.S. 1921, Pennsylvania State University		McNair, George Henry	
Leitch, John Lewis	N.Y.	McNair, George Henry	
Leitch, John Frederick, Jr.	A.K.	McNair, George Henry	
B.S. 1921, University of Arkansas		McNair, George Henry	
Leitch, James Albert	D.C.	McNair, George Henry	
B.S. 1921, U.S. Military Academy		McNair, George Henry	
Leitch, Maile Thomas	Iowa	McNair, George Henry	
A.B. 1921, State University of Iowa		McNair, George Henry	
Leitch, Carl C.	N.I.	McNair, George Henry	
A.B. 1921, University of Missouri		McNair, George Henry	
Leitch, Harry Paul	Pa.	McNair, George Henry	
A.B. 1921, University of Pittsburgh		McNair, George Henry	
Leitch, Arthur	N.Y.	McNair, George Henry	
A.B. 1921, Davis and Elkins College		McNair, George Henry	

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Mayer, Edward Douglas, Jr.	I	Mayer, Richard L.	W. V.
B. A. 1941, University of Wisconsin		B. S. 1943, West Virginia University	
Melrose, Leland R.	III	Meador, Paul Marvin	Mass.
B. S. 1937, University of Utah		A. B. 1942, University of Wisconsin	MI
Melrose, Thomas E.	Mass.	Mee, Arnold M.	MI
B.A.A. 1918, University of Miami		B. S. 1922, University of New Hampshire	MI
Melrose, Charles F. (1917)	Fla.	Meador, James Philip	
B.S. in B.S. 1941, Georgetown University		A. B. 1939, The George Washington University	
Melrose, Charles Allen	Ohio	Mee, John Henry	N. J.
B.S. 1934, University of Cincinnati		Mee, M. E. 1911, North Carolina State University	
Melrose, Charles LeRoy	Va.	Graduate of Agriculture and Forestry	
B. S. 1937, Miami School of Marine and Coastal Arts		Mee, John M.	
Melrose, Anne Whitford	MA	A. B. 1945, Johns Hopkins University	Va.
A. B. 1937, The George Washington University		Mee, Ross H.	
Melrose, David Ross	MI	A. B. 1939, Mount Saint Joseph	
B. S. 1943, The George Washington University		M. Ed. in 1945, Emory University	Va.
Melrose, James William	Ill. C.	Mee, William John	
B. M. E. 1939, New York University		B. S. in B. A. 1939, University of Kansas	
Melrose, Jack W.	Mass.	B. A. in B. S. 1937, Kansas State Teachers College, Emporia	Pa.
B. S. 1939, Massachusetts Institute of Technology		Melrose, Arthur George	Pa.
Melrose, John Franklin	Va.	Melrose, Charles William	Pa.
B. S. E. 1939, University of Kentucky		B. S. 1939, University of Maryland	Pa.
Melrose, Kenneth Earl	Ill. C.	Melrose, Richard Paul	
B. S. E. 1941, Fairleigh Dickinson		B. S. 1943, Middlebury College	Pa.
Melrose, Richard Lee	Va.	Melrose, George Francis	
B. S. 1942, West Virginia University		B. S. 1941, Washington University	Pa.
Melrose, Leonard William	Ill.	Melrose, Charles William	
B. A. 1931, University of Maryland		A. B. 1937, M. S. 1939, University of Kentucky	Pa.
Melrose, William Charles	Pa.	Melrose, Thomas Allen	
B. S. 1931, University of Maryland		B. S. 1931, Washington University	Pa.
Melrose, John Ross	Pa.	Melrose, John Lewis	
B. S. 1931, University of North Carolina		B. S. in B. A. 1937, Pennsylvania University	Pa.
Melrose, Gordon Allen	Mass.	Melrose, James Clark	
B. S. in B. S. 1939, Northern Indiana State University		B. S. in M. E. 1937, University of Michigan	
Melrose, John Henry	N. J.	Melrose, M. E. 1937, University of Wisconsin	
B. S. 1939, Rutgers University		B. S. E. 1939, The George Washington University	Va.
Melrose, Gordon Ross	Pa.	Melrose, Thomas	
B. S. 1939, University of Arkansas		B. S. 1939, University of Kentucky	Pa.
Melrose, Jerry William	Wash.	Melrose, Lewis William	
B. S. 1939, H. A. Mitchell Middle School		B. S. 1939, University of Kentucky	
Melrose, Charles James	Nash.		
B. A. 1938, Princeton University			
Melrose, Robert John	Pa.		
B. S. 1939, Indiana University			
Melrose, William William	Pa.		
B. S. in M. E. 1937, Illinois Institute of Technology			
Melrose, Robert John	Pa.		
B. S. 1937, The George Washington University			
Melrose, William Charles, Jr.	Conn.		
B. S. 1937, University of Connecticut			
Melrose, John Henry	Pa.		
B. S. 1938, Haver College			
B. S. in 1939, A. M. 1943, Fairleigh Dickinson University			
Melrose, Charles Lee	Pa.		
B. S. in B. S. 1937, Ford University			
Melrose, James Thomas	Va.		
B. S. 1939, University of Miami			
Melrose, William Henry	Nash.		
B. S. 1939, University of Kentucky			
Melrose, Eugene Mont	Pa.		
B. S. 1939, A. B. E. 1941, University of Utah			

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Reilly, John Wilson	N.H.	Reynolds, Raymond Joseph	Vt.
B.S. 1911, Cornell University of New York		A.B. 1915, Georgetown College	
Reilly, Robert Joseph	Mo.	Reynolds, Robert Joseph	Pa.
A.B. 1911, Georgetown College		B.S. 1911, University of Virginia	
Reilly, Robert Joseph	N.Y.	Rice, William James	Mo.
B.S. 1911, Cornell University		A.B. 1911, M.A. 1912, University of Maryland	
Reilly, Mary Frances	N.C.	Reynolds, Richard Lee	Vt.
A.B. 1911, Duke University		A.B. 1911, Georgetown College	
Reilly, William Jay	Mo.	M.S. 1911, Indiana University	
B.S. 1911, College of the City of New York		Rady, O'Leary Henry	N.Y.
A.M. 1911, Catholic University		A.B. 1911, Newell University	
Reilly, Richard Harrison, Jr.	Vt.	Rams, Arnold Eugene	Mo.
A.B. 1911, Duke University		A.B. 1911, American University	
Reilly, John Eugene	Vt.	A.B. 1911, The George Washington University	
A.B. 1911, Williams College		Randall, Robert Raymond	Mo.
Reilly, Richard W.	Vt.	A.B. 1911, University of Missouri	W.
A.B. 1911, Cornell University		Rand, Louis	
B.S. 1911, University of Missouri		B.S. 1911, University of Wisconsin	Mo.
Reilly, John	Pa.	Rand, William James	Pa.
A.B. 1911, University of Missouri		A.B. 1911, A.M. 1912, Cornell University	
Reilly, John	Vt.	Rand, Ralph	Mo.
B.M.E. 1911, U.S. Maritime Service		A.B. 1911, University of Wisconsin	
Reilly, Robert Joseph	N.Y.	Rand, John Henry	Mo.
A.B. 1911, University of Nevada		A.B. 1911, The George Washington University	
Reilly, John Joseph	Vt.	Randall, Francis George	Pa.
A.B. 1911, University of Washington		B.S. 1911, University of Utah	Mo.
Reilly, John Joseph	D.C.	Rand, Francis George	Pa.
B.S. 1911, New York University		B.S. 1911, University of Maryland	
Reilly, Robert	N.Y.	Rand, John Joseph	Vt.
A.B. 1911, Cornell University		B.S. 1911, Texas Technological College	
Reilly, John Carl	Mo.	Rand, John Joseph	N.Y.
A.B. 1911, Tufts College		B.S. 1911, Virginia Polytechnic Institute	
Reilly, John Joseph	D.C.	Randall, George Francis	Vt.
B.S. 1911, Mount St. Joseph College		B.S. 1911, Niagara University	
Reilly, Donald Richard	Vt.	Randall, John Joseph	D.C.
B.S. 1911, University of Florida		B.S. 1911, University of Maryland	
Reilly, Nathan Lee	Conn.	Randall, George Francis	Pa.
A.B. 1911, Portland College		A.B. 1911, The George Washington University	
Reilly, Kenneth Victor	D.C.	Randall, Victor John	Mo.
B.S. 1911, U.S. Naval Academy		Diploma in Law 1911, J.L.M. 1911	
Reilly, Henry	Mo.	University of Texas, Austin	
B.S. 1911, The George Washington University		M.C.L. (Am.J.) 1911, The George Washington University	
Reilly, LaVelle Eugene	S.D.	Rand, Carl E.	Vt.
B.S. 1911, Brock Dakota School of Mines		B.S. 1911, Madison College	
and Teachers		Rand, Mary Thomas	N.Y.
Reilly, Earl Wendell	Vt.	A.B. 1911, Tufts University	
A.B. 1911, Dartmouth College		Randall, John	Vt.
		B.F.E. 1911, College of the City of New York	
		Rand, Roy Dale	Pa.
		B.S. 1911, University of Illinois	
		Rand, Thomas John	Vt.
		B.S. 1911, M.E. 1911, Princeton University	
		Rand, Charles Augustus, Jr.	Mo.
		B.F.E. 1911, University of Virginia	
		Randall, George Francis	Pa.
		A.B. 1911, American University	
		Randall, George Francis	Mo.
		B.S. 1911, M.E. 1911, University of	
		Princeton	
		Rand, John Joseph	N.Y.
		B.S. 1911, University of Colorado	
		Rand, Kenneth Norman, Jr.	D.C.
		B.S. 1911, Ohio State University	
		Rand, Mark E.	Mo.
		B.S. 1911, Columbia University	
		Rand, James David	



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# SUMMARIES OF REGISTRATION

SUMMER TERM 1956  
FALL SEMESTER 1956-57

## GEOGRAPHICAL DISTRIBUTION OF STUDENTS

United States, Territories, and Possessions

Alabama	5	New Jersey	11
Arizona	4	New Mexico	11
Arkansas	5	New York	10
California	15	North Carolina	10
Colorado	5	Ohio	8
Connecticut	12	Oklahoma	1
Delaware	7	Oregon	10
District of Columbia	143	Pennsylvania	1
Florida	13	Rhode Island	1
Georgia	1	South Carolina	1
Hawaii	9	South Dakota	1
Illinois	18	Tennessee	1
Indiana	9	Texas	1
Iowa	9	Utah	1
Kansas	10	Vermont	1
Kentucky	3	Virginia	1
Louisiana	3	Washington	11
Maine	4	West Virginia	1
Maryland	171	Wisconsin	1
Massachusetts	17	Wyoming	1
Michigan	18	Hawaii	1
Minnesota	5	Puerto Rico	1
Mississippi	3	Canada	1
Missouri	9	Japan	1
Montana	3	Latvia	1
Nebraska	5	Philippines	1
Nevada	6	Siam	1
New Hampshire	5	Thailand	1

## GRADUATES OF COLLEGES REGISTERED IN THE LAW SCHOOL

Adelphi College	2	Arkansas State Teachers College	2
Agnes Scott College	1	Arkansas University of	1
Alabama Polytechnic Institute	2	Augustine College	1
Alabama University of	3	Baylor University of	1
Albion Marine College	1	Baylor University of	1
American International College	2	Boston University	1
American University	8	Bowling Green	1
Amherst College	1	Bowling Green State University	1
Amherst University, Philippines	1	Brainerd University	1
Arizona State College	1	Brigham Young University	1
Arizona University of	4	Brigham Young University	1
Arizona Agricultural and Mechanical College	1	Brigham Young University	1





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Wisconsin State Teachers College. . . . .	1	Wyoming University of . . . . .	1
Wisconsin, University of . . . . .	12	Xavier University . . . . .	1
Wooster, College of . . . . .	2	Yale University . . . . .	12
Worcester Polytechnic Institute . . . . .	1	Yeshiva College . . . . .	1

## SUMMARY OF LAW SCHOOL REGISTRATION

## FALL SEMESTER 1925-26

	Men	Women	Total
First Year . . . . .	387	37	424
Second Year . . . . .	476	43	519
Third Year . . . . .	222	15	237
Candidates for the degree of Master of Laws . . . . .	55	1	56
Candidates for the degree of Master of Comparative Law . . . . .	13	1	14
Candidates for the degree of Master of Comparative Law (Anticipated Promotion) . . . . .	4		4
Candidates for the degree of Doctor of Juridical Science . . . . .	3		3
Unaffiliated . . . . .	21	2	23
Total . . . . .	978	79	1057

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THE SCHOOL OF ENGINEERING

1957-58





THE  
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WASHINGTON  
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BULLETIN

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VOL. LVI

No. 4

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THE SCHOOL OF ENGINEERING

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WASHINGTON 6, D. C.

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MCMLVII

BY THE UNIVERSITY





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# CALENDAR

1957-58

Date	Day	Observation
1957		
FALL SEMESTER		
Sept. 3-18 .....	Tuesday through Wednesday .....	Preadvising for all entering students and advising for freshman and sophomore students
Sept. 12 .....	Thursday .....	Orientation Assembly for all new students
Sept. 13 and 16 ...	Friday and Monday ..	Curriculum assemblies *
Sept. 17 .....	Tuesday .....	Freshman tests Examinations for students who wish to qualify for advanced courses or waive curriculum requirements
Sept. 19 and 20 ...	Thursday and Friday ..	Registration
Sept. 23 .....	Monday .....	Academic year begins
Oct. 4 .....	Friday .....	Last day on which candidates may file comprehensive problem subjects for the degrees of Master of Science in Engineering or Master of Engineering Administration to be conferred in February
Oct. 19 .....	Saturday .....	Fall Commencement
Nov. 11 .....	Monday .....	Veterans Day. Holiday
Nov. 28-30 .....	Thursday through Saturday .....	Thanksgiving recess
Dec. 7 .....	Saturday .....	Graduate Record Examination
Dec. 23-Jan. 4 ...	Monday through Saturday .....	Christmas recess
1958		
Jan. 6 .....	Monday .....	Classes resume Last day for receiving theses and comprehensive problems of candidates for the Master's degrees and for the professional degrees in Engineering to be conferred in February
Jan. 6-17 .....	Monday through Friday .....	Advising for entering, freshman and sophomore students

\* All new students are required to attend one Curriculum Assembly

Date	Day	Occasion
Jan. 15 .....	Wednesday .....	Last day of classes for the fall semester
Jan. 20-28 .....	Monday through Tuesday .....	Examination period
SPRING SEMESTER:		
Jan. 29 .....	Wednesday .....	Examinations for students who wish to qualify for advanced courses or waive curriculum requirements
Jan. 30 and 31 ...	Thursday and Friday .....	Registration
Feb. 3 .....	Monday .....	Classes resume for the spring semester
Feb. 14 .....	Friday .....	Last day on which candidates may file comprehensive problem subjects for the degrees of Master of Science in Engineering or Master of Engineering Administration to be conferred in June
Feb. 22 .....	Saturday .....	Winter Convocation. Holiday
April 1 .....	Tuesday .....	Last day for receiving applications for scholarships for 1958-59
April 4-9 .....	Friday through Wednesday .....	Easter recess
April 12 .....	Saturday .....	Graduate Record Examination
May 2 .....	Friday .....	Last day for receiving theses and comprehensive problems of candidates for the Master's degrees and for the professional degrees in Engineering to be conferred in June
May 14 .....	Wednesday .....	Last day of classes for the spring semester
May 19-27 .....	Monday through Tuesday .....	Examination period
June 1 .....	Sunday .....	Baccalaureate Sermon
June 4 .....	Wednesday .....	Commencement
Sept. 18 and 19 ...	Thursday and Friday .....	Registration for the fall semester of the academic year 1958-59





THE UNIVERSITY





## THE BOARD OF TRUSTEES

The Board of Trustees of the University is composed of the President of the University ex officio and the following persons by election:

Robert Vedder Fleming, LL.D., *Chairman*

Newell Windom Ellison, A.B., LL.B., LL.D., *Secretary*

Clarence Aiken Aspinwall, LL.D., *Assistant Secretary*

Walter Maximillian Bastian, LL.B.

\*Daniel LeRay Borden, A.M., M.D.

Lyman James Briggs, Ph.D., Sc.D., D.Eng., LL.D.

John St. Clair Brookes, Jr., A.M., LL.B.

Wiley Buchanan

Mrs. Wilbur John Carr

Eugene Cassin Carusi, A.M., J.D.

\*Watson Davis, B.S. in C.E., C.E.

Mrs. Joshua Evans, Jr., A.B., Ed.D.

Charles Carroll Glover, Jr., A.M., LL.B., LL.D.

Ulysses S. Grant, 3d, B.S., Graduate United States Engineers School,  
LL.D., Sc.D.

Gilbert Grosvenor, A.M., LL.D., Litt.D., Sc.D.

\*Brooks Hays, A.B., LL.B., LL.D.

John Edgar Hoover, LL.M., LL.D.

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Alfred Henry Lawson, LL.B., LL.D.

John Keown McKee

Benjamin Mosby McKelway

James Matlack Mitchell, A.M.

Edward Kerrick Morris, LL.D.

Godfrey Leon Munter, A.B., LL.B., LL.D.

\*George Edward Muth, A.B., LL.B.

\*Miss Helen Newman, LL.M.

Donald D'Arcy Shepard, LL.B.

Sidney William Souers, A.B., LL.D.

Samuel Spencer, LL.B.

Walter Rupert Tuckerman, A.B., LL.B., LL.D.

James Edwin Webb, A.B., LL.D.

Alexander Wetmore, Ph.D., Sc.D.

\*Charles Stanley White, M.D., Sc.D.

Lloyd Bennett Wilson

\* Nominated by the alumni

## OFFICERS OF ADMINISTRATION

### THE UNIVERSITY

Cloyd Heck Marvin, Ph.D., LL.D., *President of the University*  
 Oswald Symister Colclough, B.S., LL.B., LL.D., *Dean of Faculties*  
 Myrna Pauline Sedgwick, A.B., *Administrative Secretary*  
 Henry William Herzog, B.S., *Treasurer*  
 Claud Max Farrington, A.M., *Assistant to the President*  
 Harold Griffith Sutton, M.S., *Director of Admissions*  
 Fred Everett Nessell, A.B., *Registrar; Secretary of the Faculties*  
 John Russell Mason, A.M., M.S. in L.S., *Librarian; Curator of Art*  
 Benjamin Douglass Van Evera, Ph.D., Sc.D., *Dean for Sponsored Research*  
 \*Mitchell Dreese, Ph.D., *Dean in the Office of the President*  
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 Don Carlos Lath, Ph.D., *Director of Activities for Men; Director of Veterans Education*  
 Alan Thomas Deibert, A.M., *Adviser to Students from Foreign Countries*  
 Burnice Herman Jarman, A.M., Ed.D., *Dean of the Summer Sessions*  
 Richard Bernard Castell, A.B., M.D., *Director of Health Administration*  
 Ruth Harriet Atwell, A.M., *Director of Women's Athletics*  
 Carl Swyter, B.S. in E.E., *Director of Air Science*  
 John Francis Latimer, Ph.D., *Assistant Dean of Faculties*

### THE COLLEGES, SCHOOLS, AND DIVISIONS

George Martin Koehl, A.M., *Dean of the Junior College*  
 Calvin Darlington Linton, Ph.D., *Dean of Columbian College*  
 Arthur Edward Burns, Ph.D., *Dean and Chairman of the Graduate Council*  
 John Parks, M.S., M.D., *Dean of the School of Medicine*  
 \_\_\_\_\_, *Dean of the Law School*  
 Martin Alexander Mason, B.S. in Eng., Ing.-Dr., *Dean of the School of Engineering*  
 Charles Watson Bliven, M.S., *Dean of the School of Pharmacy*  
 James Harold Fox, A.M., Ed.D., *Dean of the School of Education*  
 \_\_\_\_\_, *Dean of the School of Government*  
 Elmer Louis Kayser, Ph.D., LL.D., *Dean of the Division of University Students*

\* On leave of absence fall semester 1957-58

Warren Reed West, Ph.D., *Dean of the Division of Special Students*  
Grover LaMarr Angel, A.M., Ed.D., *Dean of the College of General Studies*

Victor Frederick Ludewig, A.B., B.S., *Administrator of the University Hospital*

Angus MacIvor Griffin, Ph.D., *Associate Dean of the School of Medicine*

William Lewis Turner, Ph.D., *Assistant Dean of the Junior College*

Carl Bartleson Lavell, A.M., *Assistant Dean in the Junior College*

Carville Dickinson Benson, A.B., LL.B., S.J.D., *Assistant Dean of the Law School*

Louis Harkey Mayo, B.S., LL.B., *Assistant Dean of the Law School*

Carl Hugo Walther, B.E., M.C.E., *Assistant Dean in the School of Engineering*

Robert Meyer Leonard, Ph.D., *Assistant Dean of the School of Pharmacy*

Blake Smith Root, A.M., Ed.D., *Assistant Dean of the School of Education*

Joe Lee Jessup, M.B.A., *Assistant Dean in the School of Government*

John Gage Allee, Jr., Ph.D., *Assistant Dean of the Division of University Students*



## HISTORY AND ORGANIZATION

### HISTORY

The idea of a university located in the Capital of the Nation was sponsored by George Washington, who during his public life urged the establishment of such an institution and who in his will left fifty shares of stock in the Potomac (Canal) Company for the endowment of a university to be established in the District of Columbia "to which the youth of fortune and talents from all parts thereof might be sent for the completion of their Education in all the branches of polite literature:— in arts and Sciences,—in acquiring knowledge in the principles of Politics & good Government".

It was George Washington's hope that the "General Government" would extend toward such an institution "a fostering hand". No steps were taken by Congress to carry out the provision of Washington's will, and the stock that he had bequeathed for the establishment of a university in the District of Columbia became valueless owing to the failure of the Potomac Canal properties.

Meanwhile, however, a movement was started by private persons under the leadership of Luther Rice to establish an institution of higher learning at the seat of the National Government for the education of the Baptist ministry and to afford general collegiate training. In 1819 an association was formed by Luther Rice, Obadiah B. Brown, Spencer H. Cone, and Enoch Reynolds for the purpose of raising funds to buy land for the use of the college.

A group of the Nation's leaders who were especially interested in Washington's idea became patrons of the college and contributed to funds raised for the purchase of land and erection of buildings. Among them were James Monroe, President of the United States; William H. Crawford, Secretary of the Treasury; John C. Calhoun, Secretary of War; William Wirt, Attorney General; Return J. Meigs, Postmaster General; and thirty-two members of the Congress.

Legally to implement the college a petition was made to Congress for the incorporation of "the General Convention of the Baptist Denomination in the District of Columbia for evangelical and literary purposes". This petition was denied by Congress, on April 26, 1820, because of its sectarian character.

Failing to obtain a denominational charter, members of the association enlarged their objective to embrace national aims, and with the sponsorship of Government leaders there was presented in Congress a

bill for the incorporation of "the Columbian Society for literary purposes", it being proposed to realize in this way "the aspirations of Washington, Jefferson and Madison for the erection of a university at the seat of the federal government".

Acting upon this second petition, on February 9, 1821, Congress chartered Columbian College in the District of Columbia, inserting in the charter by special action the provision "That persons of every religious denomination shall be capable of being elected Trustees; nor shall any person, either as President, Professor, Tutor or pupil, be refused admittance into said College or denied any of the privileges, immunities or advantages thereof, for or on account of his sentiments in matters of religion".

Thus Columbian College in the District of Columbia was chartered by Congress as one of the early nonsectarian institutions of higher learning in the United States, under the distinguished favor of President James Monroe and members of his Cabinet.

A tract of approximately forty-seven acres, extending about one-half mile northwest of Boundary Street (Florida Avenue) between Fourteenth and Fifteenth Streets, was purchased and by 1822 the main building was completed sufficiently to use.

Two years later, when the first Commencement was held on December 15, 1824, Congress and the Supreme Court adjourned their sessions to enable their members to attend the exercises. President Monroe, John Quincy Adams, John C. Calhoun, Henry Clay, and the Marquis de Lafayette headed the eminent company in attendance.

By an act of Congress of March 3, 1873, the name of the college was changed to "Columbian University", in recognition of the enlarged scope of the institution. In 1884 the University was moved from its first location on "College Hill", now Columbia Heights, to the new University Hall built for it at Fifteenth and H Streets. Near-by buildings accommodated the School of Medicine and, somewhat later, the Law School.

For a period of six years, from 1898 to 1904, the University was placed under control of the Baptist Denomination. In 1904 an act restoring the original secular character of the University and authorizing change of name to The George Washington University was passed by Congress.

Subsequently all the colleges, schools, and divisions of the University except the School of Medicine were brought together in the area bounded by Nineteenth, Twenty-third, and G Streets, and Pennsylvania Avenue NW. The School of Medicine is situated on H Street between Thirteenth and Fourteenth Streets NW.

The endowment of the University is \$4,000,000.

## THE COLLEGES, SCHOOLS, AND DIVISIONS

The George Washington University includes fourteen colleges, schools, and divisions, as follows:

The Junior College offers the work of the first two years of the four-year college program in the liberal arts and sciences and two years of pre-professional work. Each of these curricula leads to the degree of Associate in Arts. It also offers two-year terminal curricula. Those in Accounting and Secretarial Studies lead to the degree of Associate in Arts; those in Home Economics, Medical Technology—Basic Course, and Physical Science lead to the degree of Associate in Science.

Columbian College offers the work of the junior and senior years of the four-year college program in the liberal arts and sciences leading to the degrees of Bachelor of Arts and Bachelor of Science. It also offers the studies leading to the degrees of Master of Arts and Master of Science in the fields of the liberal arts and sciences.

The Graduate Council offers a program of advanced study and research leading to the degree of Doctor of Philosophy.

The School of Medicine offers work leading to the degree of Doctor of Medicine.

The Law School offers professional and graduate courses leading to the degrees of Bachelor of Laws, Juris Doctor, Master of Laws, Master of Comparative Law, and Doctor of Juridical Science.

The School of Engineering offers courses leading to the degrees of Bachelor of Civil Engineering, Bachelor of Electrical Engineering, Bachelor of Mechanical Engineering, Bachelor of Science in Engineering, Master of Science in Engineering, and Master of Engineering Administration. It also directs work leading to the professional degrees in the fields of civil, electrical, and mechanical engineering.

The School of Pharmacy offers courses leading to the degrees of Bachelor of Science in Pharmacy and Master of Science in Pharmacy.

The School of Education offers undergraduate programs leading to the degrees of Bachelor of Arts in Education, Bachelor of Science in Home Economics, and Bachelor of Science in Physical Education, and graduate studies leading to the degrees of Master of Arts in Education and Doctor of Education.

The School of Government offers undergraduate programs of study in Foreign Affairs, Public Affairs, Accounting, Business Administration, and Statistics, leading to the degree of Bachelor of Arts in Government. Graduate work is offered leading to the following degrees: Master of Arts in Government in the fields of Foreign Affairs, Public Affairs, Economic Policy, Accounting, Business and Economic Statistics, and Counseling; Master of Arts in Public Administration; Master of Arts in Personnel Administration; Master of Business Administration, and Doctor of Business Administration.



The College of General Studies supplements the adult education program of the University through its On-Campus Division, Campus Division, and Division of Community Services.

The Division of University Students makes available courses for mature students, not candidates for degrees in this University.

The Division of Special Students makes available courses for students in the process of qualifying for degree candidacy.

The Division of Air Science offers a program of Air Force ROTC training which is integrated with the curricula of the colleges and schools of the University and leads to appointment as a commissioned officer in the United States Air Force Reserve.

The Summer Sessions.

#### ACADEMIC STATUS

The George Washington University is accredited by its regional accrediting agency, the Middle States Association of Colleges and Secondary Schools. This is important to students who wish to transfer credits from one institution to another.

The University is on the approved list of the American Association of University Women and is a member of the College Entrance Examination Board.

The Law School is a charter member of the Association of American Law Schools and is approved by the Section of Legal Education and Admissions to the Bar of the American Bar Association. The School of Medicine is a member of the Association of American Medical Colleges and is one of the medical colleges which have been continuously approved by the American Medical Association. The School of Pharmacy is accredited by the American Council on Pharmaceutical Education as a class "A" school. It is a member of the American Association of Colleges of Pharmacy. The School of Engineering is on the accredited list of the Engineers' Council for Professional Development. The School of Education is a charter member of the American Association of Colleges for Teacher Education.

#### LOCATION

The George Washington University is in downtown Washington four blocks west of the White House and east of the Potomac River with its extensive parkway. Readily accessible to the University are many of the departments of the Government, including the Department of State, the Department of the Treasury, the Department of Justice, the Department of the Army, the Department of the Navy, the Department of the Interior, the Department of Agriculture, the Department of Commerce,

and the Department of Labor, as well as the National Archives, the Capitol, the Library of Congress, the National Academy of Sciences, the Pan American Union, the National Gallery of Art, and the Corcoran Gallery of Art.

#### GOVERNMENT

The government and general educational management of The George Washington University are vested in a self-perpetuating Board of Trustees, with the President of the University as a member *ex officio*. The members of the Board are named for a period of three years and are divided into three classes. The members of one class are elected at each annual meeting to fill the places of the members whose terms of office expire. Two members of each class are nominated by the Alumni Association.

THE SCHOOL OF ENGINEERING

1957-58





## THE SCHOOL OF ENGINEERING

### THE FACULTY AND STAFF OF INSTRUCTION \*

MARTIN ALEXANDER MASON, B.S. in Eng., Ing.-Dr., *Dean of the School of Engineering*

CARL HUGO WALTHER, B.E., M.C.E., *Assistant Dean in the School of Engineering*

JACK EDWARD WALTERS, M.S. in M.E., Ph.D., *Director, Engineering Administration Program*

---

GEORGE ABRAHAM, M.S.  
*Lecturer in Electrical Engineering*

WILLIAM ALDERSON, M.S. in E.E.  
*Lecturer in Electrical Engineering*

NORMAN BRUCE AMES, M.S. in E.E., LL.B., DR. SC. TECH.  
*Professor of Electrical Engineering*

WILLIAM WALTER BALWANZ, B.E.E., M.S. in E.E.  
*Lecturer in Electrical Engineering*

RAPHAEL DAVID CAHN, B.M.E.  
*Lecturer in Mechanical Engineering*

GLEN DARWIN CAMP, Ph.D.  
*Professor of Operations Research*

BURTON BRYANT CHANDLER, M.B.A.  
*Professorial Lecturer in Engineering Administration*

KENNETH SEYMOUR COLMEN, B.A.E., Ph.D.  
*Professorial Lecturer in Engineering Administration*

PAUL ARTHUR CRAFTON, B.M.E., Ph.D.  
*Associate Professor of Mechanical Engineering*

BENJAMIN CARPENTER CRUICKSHANKS, B.S. in M.E.  
*Professor of Mechanical Engineering*

LOUIS DEPIAN, Ph.D.  
*Associate Professor of Electrical Engineering*

FRANK DOUGLAS, M.B.A.  
*Professorial Lecturer in Engineering Administration*

FREDERICK CHARLES DYER, M.B.A.  
*Professorial Lecturer in Engineering Administration*

RAYMOND PUGH EYMAN, C.E.  
*Associate Professor of Civil Engineering*

ERNEST FRANK, B.E.E., M.S. in E.E., Ph.D.  
*Associate Professor of Electrical Engineering*

RALPH EDWARD FUHRMAN, B.S. in C.E., M.S. in Eng., D.E.N.  
*Professor & Lecturer in Civil Engineering*

SHELTON MANN GAY, Jr., M.S.  
*Lecturer in Civil Engineering*

WILLIAM HERBERT GOSSARD, A.B., M.S. in E.E.  
*Lecturer in Electrical Engineering*

NELSON THOMAS GRISAMORE, Ph.D.  
*Assistant Professor of Electrical Engineering*

JOSEPH ELIAS GUIDRY, B.E., M.S. in E.E.  
*Lecturer in Electrical Engineering*

ROLAND LEE HARDY, B.S., B.S. in C.E., C.E.  
*Assistant Professor of Civil Engineering*

FOREST KLAIRE HARRIS, Ph.D.  
*Professional Lecturer in Electrical Engineering*

JAMES MILTON HEADRICK, M.S.  
*Lecturer in Electrical Engineering*

ROBERT AARON HECHTMAN, M.S. in C.E., Ph.D.  
*Professor of Civil Engineering*

FRANK LEWIS HERMACH, B.E.E.  
*Lecturer in Electrical Engineering*

ROBERT JAY HERMANN, B.S. in E.E.  
*Associate in Electrical Engineering*

JOSEPH LAMBERT INTERMAGGIO, M.R.P.  
*Lecturer in Civil Engineering*

GILBERT CHESTER JACOBUS, B.S. in C.E., M.B.A., LL.B.  
*Professional Lecturer in Engineering Administration*

JOHN KAYE, M.S. in M.E.  
*Associate Professor of Engineering Administration*

IRVING KOROBKIN, B.M.E., M.S. in M.E.  
*Lecturer in Mechanical Engineering*

GERSHON KULIN, M.S., Sc.D.  
*Lecturer in Civil Engineering*

ROBERT STEVEN LUDLEY, D.D.S., A.M.  
*Assistant Professor of Electrical Engineering*

THOMAS PHILLIP LIVERMAN, Ph.D.  
*Professional Lecturer in Engineering Administration*

ALVIN LOEWER, Jr., B.E., Dr. Eng.  
*Professional Lecturer in Civil Engineering*

KERMIT MILTON LOVELL, B.S. in E.E.  
*Lecturer in Electrical Engineering*



MARTIN ALEXANDER MASON, B.S. IN ENG., ING.-DR.  
*Professor of Civil Engineering, Dean of the School of Engineering*

NELLY FORSYTHE JONES MATTHEWS, B.S.E.  
*Instructor in Electrical Engineering*

KENNETH FREDERICK MCTURE, M.S., II.B.  
*Professorial Lecturer in Engineering Administration*

FLORENCE MARIE MEARS, PH.D.  
*Professor of Mathematics*

FREDERICK THORP MOORE, PH.D.  
*Professorial Lecturer in Engineering Administration*

\*ROBERT HAMILTON MOORE, PH.D.  
*Assistant Professor of English Composition*

PHILIP SIDNEY MORGAN, JR., B.S., M.S. IN M.E.  
*Assistant Professor of Mechanical Engineering*

ALBERT CHRISTIAN MURDAUGH, M.S.MET.E.  
*Assistant Professor of Mechanical Engineering*

CHARLES RUDOLPH NAESER, PH.D.  
*Professor of Chemistry*

GENE MILO NORDBY, PH.D.  
*Lecturer in Civil Engineering*

GEORGE JOSEPH O'HARA, M.S. IN CE.  
*Lecturer in Civil Engineering*

ROBERT WILLIAM PINNES, M.M.E.  
*Lecturer in Mechanical Engineering*

FRANK JOSEPH POWELL, M.S.  
*Lecturer in Mechanical Engineering*

FRANK MILLER REYNOLDS, LL.M., B.S.  
*Professional Lecturer in Engineering Administration*

LOUIS SAMUEL ROTOLO, B.S. IN E.E.  
*Assistant in Electrical Engineering*

LLEWELLYN ADAM RUBIN, B.S. IN E.E.  
*Instructor in Electrical Engineering*

SHELDON NORMAN SALZMAN, M.S.  
*Lecturer in Civil Engineering*

ROBERT IRVING SAREVACHER, S.D., E.E.  
*Professorial Lecturer in Electrical Engineering*

PETER HANS SAWITZ, M.S. IN E.E.  
*Lecturer in Electrical Engineering*

DWIGHT EDWARD SHYLLI  
*Lecturer in Electrical Engineering*

\* On sabbatical leave from summer 1945-46.

RALPH SIEGEL, B.S. in E.E.

*Lecturer in Electrical Engineering*

LEWIS SLACK, Ph.D.

*Professor of Physics*

ALEXIS SMISLOVA, M.S. in C.E.

*Lecturer in Civil Engineering*

WALDO EDWARD SMITH, B.E. in C.E., M.S. in C.E.

*Professional Lecturer in Civil Engineering*

NATHANIEL STEWART, M.S., Ed.D.

*Professorial Lecturer in Engineering Administration*

LEO SHANLEY STRAW, B.S. in C.E.

*Associate in Mechanical Engineering*

MICHAEL PAUL STRZELEC, B.S.

*Associate in Electrical Engineering*

JAMES HENRY TAYLOR, Ph.D.

*Professor of Mathematics*

RODNEY DOUDY TILLET, LL.B., M.S., Sc.D.

*Associate Professor of Engineering Administration*

JACK EDWARD WALTERS, M.S. in M.E., Ph.D.

*Professor of Engineering Administration, Director, Engineering Administration Program*

CARL HUGO WALTHER, B.E., M.C.E.

*Professor of Civil Engineering, Assistant Dean of the School of Engineering*

GEORGE CALVIN WEAVER, M.S.

*Associate Professor of Mechanical Engineering*

DAVID GOVER WHITE, B.Chem. Eng., Ph.D.

*Associate Professor of Chemistry*

ROBERT JAMES WILSON, A.M., Ed.D.

*Professorial Lecturer in Engineering Administration*

#### THE ADVISORY COUNCIL

ALLEN VARLEY ASTIN, Ph.D.

*Director of the National Bureau of Standards*

LYMAN JAMES BRIGGS, Ph.D., Sc.D., LL.D.

*Trustee of the University*

HUGH LATIMER DRYDEN, Ph.D., Sc.D., D.Eng.

*Director of Research of the National Advisory Committee for Aeronautics*

RALPH LEON GOETZENBERGER, B.S., F.E.

*Vice-President of the Minneapolis-Honeywell Regulator Company*

DANIEL CHARLES WALSER, B.S.

*Consulting Engineer; former Chairman of the District of Columbia Board of Registration for Professional Engineers*

The Council is made up of friends of the University who are intimately familiar with the educational needs of the professional community

served by the School. The Council is advisory to the Dean of the School of Engineering; it serves the function of relating the School to the educational requirements of the engineering and scientific constituency served by the School.

#### STUDENT ASSISTANTS 1956-57

*Civil Engineering.*—Percy Andros, Mary Kathryn Bowers, Sami Khalil Jabbour, William Charles Koutalidis, Ronald Joseph Kransdorf, Vladimir Vratislav Saba, Sandra Lee Spivak.

*Electrical Engineering.*—John Paul Barranger, Roy Dale Brooks, John C. Cromack (M.S.), Joseph Anthony Greblunas, Anthony Thomas Lane, Neely Forsyth Matthews, Franklin Dean McLernon (B.S.), Derrill Conway Rohlfs (B.E.E.).

*Mechanical Engineering.*—Wylie Winfield Barrow, Jr., Abdullatif Ahmad Fakhoury, David Andrew Lewis, Eugene Wong.

#### ADMINISTRATIVE STAFF

Clarita Maxine Watkins, *Secretary to the Dean*

Gladys Lacey, *Clerk-Typist*

Janet Cornelia Thayer, *Clerk-Typist*

Patricia Anne Farrington, *Clerk-Typist*

#### COMMITTEES\*

##### THE DEAN'S COUNCIL†

1958

James Henry Taylor  
Robert Aaron Hechtman

1959

Jack Edward Walters  
Lewis Slack

1960

Ernest Frank  
Paul Arthur Crafton

##### COMMITTEE ON ADMISSION AND ADVANCED STANDING

Carl Hugo Walther, *Chairman*

Robert Aaron Hechtman

Ernest Frank

##### COMMITTEE ON SCHOLARSHIP

Carl Hugo Walther, *Chairman*

Robert Aaron Hechtman

David Gover White

Ernest Frank

\* The President of the University, the Dean of the School and the Assistant Dean in the School of Engineering are members of these and all committees.

† Elected by the Faculty.



## COMMITTEE ON GRADUATE STUDIES

Ernest Frank, *Chairman*

James Henry Taylor

Robert Aaron Hechtman

John Kaye

Lewis Slack

Paul Arthur Crafton

Louis Deplan

Keith Harder (Liaison Member)

Ronald I. Wyble (Liaison Member)

## GENERAL INFORMATION

## INTRODUCTORY

The School of Engineering was organized October 1, 1884 as the Corcoran Scientific School of Columbian College and was situated in the University Building then at 15th and H Streets, NW. The school was named in honor of William W. Corcoran, Trustee and President of the Corporation from 1869 to 1888. Day and evening courses were offered in Literature, Science and Technology and led to the degrees of Bachelor of Science, Civil Engineer, Mechanical Engineer, and Mining Engineer. The School was among the first to accept women for degree candidacy in engineering.

In 1902 the Corcoran Scientific School, the School of Graduate Studies, and the Columbian College were merged into a single Department of Arts and Sciences. Engineering degrees were made graduate in character and the student was required to hold a Bachelor of Science degree as a prerequisite to entrance. An indication of the developing character of the School is found in the entrance requirements which stated that "The candidate must give evidence he has completed a liberal undergraduate course—which was of such character as to fit him to pursue to advantage the study of advanced engineering subjects".

Administrative changes led to The Washington College of Engineering being initiated in 1905 as one of the several semi-independent undergraduate colleges of the University, each with its own Board of Trustees. The College provided instruction leading to undergraduate degrees in engineering and architecture.

In 1909 the name of the College was changed to the College of Engineering and Mechanic Arts, and the curricula were revised to give the student a thorough understanding of the theory underlying engineering practice. Emphasis was placed on the development of a knowledge of scientific principles upon which the student could build and by which he might solve new problems as they are met in practice.

The name of the school was changed again in 1914 to the College of Engineering and later to the School of Engineering. Architecture was dropped from the curriculum and degrees were limited to the field of engineering. However, the primary emphasis upon principles rather than technology which had characterized the School since 1902 was continued.

and has remained to this day as one of the important distinguishing features of the School.

It has become traditional in the School of Engineering to maintain an intimate relationship between the students and the modern practices of engineering by including among the staff of instruction practicing engineers familiar with the latest problems and procedures of engineering science. The instructors participating in this plan bring to the student a direct contact with the practice of engineering and help to insure an effective balance of instruction between the principles of engineering and application of the principles to the many new problems confronting engineers today.

The courses of instruction are open to both men and women, continuing the practice first initiated in 1884.

#### OBJECTIVE

The objective of the School of Engineering is to produce graduates who possess knowledge and understanding of the fundamental scientific principles in their fields of study, some skill in their application; and an attitude of responsibility toward society and the engineering profession.

#### PROGRAMS OF STUDY

Programs of undergraduate study are offered leading to the degrees of Bachelor of Civil Engineering, Bachelor of Electrical Engineering, Bachelor of Mechanical Engineering, and Bachelor of Science in Engineering (with optional areas of concentration).

Graduate work is offered under the supervision of the Committee on Graduate Studies, leading to the degrees of Master of Science in Engineering and Master of Engineering Administration.

#### HOURS OF INSTRUCTION

Courses of instruction are scheduled in the morning, afternoon, and evening. Evening classes are identical with daytime sections or corresponding courses, may be taught by the same instructors, and carry the same amount of credit. By taking the evening and summer classes and extending the time of study beyond the customary four years, a student who is able to give only part of his time to college work may complete a regular course and obtain a degree.

#### VETERANS EDUCATION

The Office of Veterans Education of The George Washington University operates as a service bureau for veterans interested in studying at the University and acts in a liaison capacity between the University and the Veterans Administration. Here information may be obtained

concerning the educational program of the University and the procedures for securing the educational benefits under the GI and War Orphan bills.

#### PUBLIC LAW 614

##### (War Orphan Educational Assistance Act)

A child of a person who died of a disease or injury incurred or aggravated while on active duty in the Armed Forces during World War I, World War II, or the Korean Conflict may be eligible for educational assistance under this Act, if certain age requirements are met. In the case of a child who has not reached the age of majority, his guardian must make application for him to the Veterans Administration. For further information concerning the benefits available under this Law, consult the University Office of Veterans Education at the Veterans Administration, Mainroom Building, Constitution Avenue at Twentieth Street NW, Washington 25, D. C.

#### PUBLIC LAW 140

##### (World War II GI Bill)

The educational benefits for veterans under Public Law 140 terminated July 25, 1946, except as hereinafter noted.

The Armed Forces Voluntary Reenlistment Act of 1945 (Public Law 190) provided that persons enlisting or reenlisting in the Armed Forces between October 6, 1943, and October 5, 1946, may count the entire period of such enlistment or reenlistment as war service for purposes of GI Bill benefits. Such persons have four years from the date that enlistment ended to begin training and nine years from that expiration date to complete training under this provision.

It is suggested that a veteran having any question regarding his eligibility consult the University Office of Veterans Education at the Veterans Administration, Mainroom Building, Constitution Avenue at Twentieth Street NW, Washington 25, D. C.

#### PUBLIC LAW 550

##### (Korean GI Bill)

In order to be eligible for the benefits under this GI Bill, a veteran must have been in service between June 27, 1950 and January 31, 1955, and must no longer be an active duty. For further information concerning these benefits, consult the University Office of Veterans Education or the Veterans Administration, Mainroom Building, Constitution Avenue at Twentieth Street NW, Washington 25, D. C.

At least thirty days prior to registration the veterans wishing to attend



under this GI Bill should apply to the Veterans Administration for a Certificate for Education and Training, for presentation to the University Office of Veterans Education at the time of registration. A photostatic copy of his DD214 must accompany the original application for certification.

#### PUBLIC LAWS 16 AND 894

##### (Vocational Rehabilitation)

Disabled veterans desiring vocational rehabilitation under either GI Bill should apply to Veterans Administration, Mainroom Building, Constitution Avenue at Twentieth Street NW, Washington 25, D. C., for approval of their training objectives at least sixty days prior to registration.

#### SERVICE SCHOOL CREDITS

A limited amount of credit earned in service schools since 1941 may be considered for assignment to qualified degree candidates in accordance with faculty regulations of the Junior College, Columbian College, the School of Engineering, and the School of Government. To be considered for such credit, veterans should submit to the Director of Admissions photostatic copies of their service school records, indicating courses successfully completed with sufficient identification of the course to locate it in the Guide to Evaluation of Educational Experience in the Armed Forces.

#### AIR FORCE RESERVE OFFICERS' TRAINING CORPS

##### ELIGIBILITY REQUIREMENTS

Enrollment in the Division of Air Science is open to all full time men students and a limited number of women who are at least 14 years of age, citizens of the United States, physically fit, of good character, and candidates for Bachelor's degrees. Men and women enrolled in Air Force ROTC are designated Cadets and Cadettes, respectively. Cadets who successfully complete the basic course or have equivalent active military training may be selected to enter the advanced course. Cadets in the advanced course receive from the Government a subsistence allowance of approximately \$500, which is exempt from income tax. During the period of summer training the advanced cadet receives, in addition, \$75 a month, plus food, lodging, and travel expense. Uniforms, textbooks, and training materials are provided for all Air Science courses.

A cadet enrolling in the basic course must agree to successfully complete the two-year course as a prerequisite to graduation from the University. A cadet applying for enrollment in the advanced course must, if selected, sign a contract to complete the course as a prerequisite to gradu-

ation; attend a four- to six-week summer training unit; and fulfill all the obligations conjunctive with military service delay specified below.

A limited number of women may enter the advanced course and, upon successful completion thereof, may be considered for commissions as officers in the United States Air Force Reserve.

#### MILITARY SERVICE DELAY

Deferment from induction under the Selective Service Act of 1961 may be granted to selected cadets within authorized quotas. Normally, a cadet is not considered for draft deferment until he has completed one semester's work in the University, with a quality-point index of at least 2.00. A cadet's deferment is subject to withdrawal if his quality-point index falls below 2.00.

The Air Force Reserve Officers' Training Corps (Air Force ROTC) unit was established at the University in 1951 under authority of Section 4047C, National Defense Act of June 3, 1916, as amended. Air Force personnel, approved by the President of the University, are detailed by the Department of the Air Force to supervise and conduct the Air Force ROTC program.

The mission of the Air Force ROTC program is to select and prepare students through a permanent program of instruction to serve as commissioned officers in the Regular and Reserve components of the United States Air Force. Classroom instruction and leadership training are provided to develop in the student the knowledge and the attributes of character, personality, and leadership required of officers in the United States Air Force. Emphasis is placed on arousing in the student a desire to serve his country as a flying officer.

#### HEALTH ADMINISTRATION

The University maintains a health service that is primarily diagnostic in its intent. For medical emergencies and health consultations there is, on the Campus, a Student Health Clinic open from 9:00 A.M. to 5:00 P.M., with physician and nurse in attendance. There is also a rest room for women, with a graduate nurse in charge.

Medical privileges include: (1) the physical examination of every student entering from secondary school;\* (2) three visits by the University physician or surgeon, office or residence (District of Columbia), in any one illness, exclusive of a specialty surgical operation, laboratory, or X-ray examination; (3) hospitalization, including board and nursing in the University Hospital for not more than one week during any twelve-month period—the necessity to be determined by the Director of Health Administration. The duration of hospitalization period (maximum, one

\* A change of 48 hrs. a special physical examination is made by the University if a student fails to appear for a physical examination during the period of 48 hrs. after entry.

week) is also to be determined by the Director of Health Administration.

This medical benefit does not apply to illness or disability incurred previous to the University term or prior to payment of tuition fees.

The student is allowed if he so desires, to engage physicians and nurses of his own choice, but when he does so he will be responsible for the fees charged.

Rules: (1) The Director of Health Administration is empowered to limit or deny the medical benefits where, in his discretion, a student has, by his misconduct or breach of the rules of the University, made himself ineligible; (2) the Director of Health Administration has authority to determine the necessity and length of hospitalization; (3) a student who has severed his connection with the University is ineligible for medical benefits; (4) a student intending to train for an athletic team is required to pass a thorough examination at the beginning of each semester; (5) the above regulations apply also during the summer term of the University.

The University is not responsible for injuries received in inter-collegiate or intramural games, or in any of the activities of the departments of physical education.

#### LIVING ACCOMMODATIONS

The University maintains four residence halls. Meals are served at the Student Union.

Admission to the University does not include a room reservation. A separate application for a room should be made well in advance (for the fall semester by May first, for the spring semester by January first). Forms for application, together with detailed information, may be obtained from the Director of Activities for Women or the Director of Activities for Men.

Information concerning private rooming and boarding facilities near the University, for women students twenty-one years of age or older and for men students, may be obtained at the Housing Office, Lisner Auditorium. The reservation of rooms in private houses must be made by students.

Girls under the age of twenty-one who are enrolled for twelve or more semester hours of academic work in the University and who are not living with their parents or relatives may live outside the dormitories only with the permission and approval of the Director of Activities for Women, upon receipt of written requests from parents. In no case will permission be granted for such girls to be domiciled outside the dormitories except with persons approved by the Director of Activities for Women.

*Women Students*—The Hattie M. Strong Residence Hall provides single rooms at \$48 a month and double rooms at \$33 a month a person.



The Dolly Madison Residence Hall provides double rooms at \$34 a month a person.

*Men Students*—Welling Hall provides double rooms for \$32 a month a person.

The John Quincy Adams Residence Hall provides 70 double rooms each with study alcove and bath. Rooms rent for \$17.50 a month a person.

### RELIGIOUS LIFE

The University recognizes the contribution that religion can make to the education of its students by encouraging them to participate in denominational clubs of their own choice. National Catholic, Jewish, and Protestant bodies support these religious organizations, which act as links between the University and the local churches. The Director of the University Chapel and the advisors to the various denominational organizations are available throughout the year for consultation on personal problems.

### UNIVERSITY CHAPEL

The University Chapel is understood as a non-sectarian expression of the faith of the University in the contribution that religion can make to the education of its students. Twenty-minute services are held Wednesday of each week at 12:10 P.M. Representative clergymen of Washington are guest speakers at these non-denominational services.

### THE PLACEMENT OFFICE

The Placement Office, 2114 G Street NW, provides assistance to students and alumni seeking full-time or part-time, temporary or permanent employment. The Office maintains a registry of positions available in many fields, both locally and nationally, and refers qualified applicants for consideration.

Students and alumni interested in placement are asked to register in person at the Office and to submit their written descriptions of current openings, positions for which they wish referral. Those interested in planning careers are invited to study the information on career fields and the brochures of business and industrial organizations, government agencies, etc., which are on display in advance of campus visits by recruiting officers. The services of the Counseling Center are available to students and alumni wishing career guidance.

The Placement Office is open from 9:00 A.M. to 5:00 P.M., Monday through Friday. Interviews for referral are held from 9:00 A.M. to 1:00 P.M.

### THE TESTING AND COUNSELING CENTER

The Testing and Counseling Center, 718 Twenty-Eight Street NW, offers services which are available to students enrolled in the University, to high school students, and to adults of the community.

The services are designed to assist individuals in the evaluation of their educational and vocational potentialities and objectives; diagnose academic difficulties; provide educational and vocational literature and information; and refer individuals to qualified agencies for assistance with problems not handled by the Center.

Social testing services provided by the Center include the administration of General Educational Development Tests, Miller Analogies Test, Minnesota Engineering Analyses Test, admission tests for the University and for other educational institutions, and tests for business and industry.

*Fees*—Excess for specialized testing, fee for retests testing and counseling based on the results of the tests. For students currently enrolled in the University, the fee is \$2.50 for former students and community clients under twenty-one years of age, \$4.00 for community clients over twenty-one, \$45. Fees for specialized testing are dependent upon the services involved. All fees are payable at the Office of the Center.

#### STUDENT UNION

The Student Union, 2128 G Street NW., is the center for student life. From the cafeteria on the first floor to the reading room on the fourth floor, it is well planned to meet the students' need for meals, study, recreation, and activities. In addition to the recreation lounge and social lounge the Student Union provides office space for the Student Council and for the other major student organizations.

The Student Activities Office, also in the Student Union, has available information concerning the student organizations and campus events.

#### DAVIS HODGKINS HOUSE

The Davis Hodgkins House, 731 Twenty-second Street NW., is the engineering student center, providing lounges, reading rooms, and student organization offices. The House provides convenient, comfortable facilities for the exchange of ideas and good fellowship among student engineers.

#### INTERNATIONAL HOUSE

The International House, 2116 G Street NW., is the social center for students from foreign countries. A series of teas, dances, and other forms of entertainment, and the use of club rooms and lounge enable students to become acquainted and feel at home in the University.

The International Students Society welcomes as members students from other lands as well as North American students.

The Adviser to Students from Foreign Countries, whose office is in International House, is available for advice and guidance.

## STUDENT ACTIVITIES

## DIRECTORS OF STUDENT ACTIVITIES

The University maintains the offices of the Director of Activities for Men and the Director of Activities for Women, for the guidance of students in all nonacademic phases of student life, such as, student activities, social life, and housing. The directors are available for individual counseling concerning personal adjustment to university life.

## STUDENT GOVERNMENT

*Student Council.*—The University believes in developing the civic responsibilities of its students by delegating to them such authority in student activities as is consistent with established policy and regulations. To this end, the organization of the University includes the Student Council, which, under the guidance of the Director of Student Activities, is responsible for the conduct of all student activities. The Student Council is elected annually by the student body.

*Committee on Student Life.*—The Committee on Student Life is the judicial branch of the student government. It is composed of not more than seven members of the faculty, two of whom are the Director of Activities for Men and the Director of Activities for Women, appointed by the President of the University, and the following members: President of Student Council, an Editor of the *Hatchet*, President of Mortar Board, President of Omicron Delta Kappa, President of the Interfraternity Council, and President of Panhellenic Council. This Committee has the power to review the acts of all student organizations, including the Student Council, and set aside acts that are contrary to established policy and regulations of the University or the Committee.

*Approval of Student Organizations.*—This Committee is granted authority to approve or disapprove the establishment of any proposed organization on campus. No student club or society (except social fraternities, sororities, scholastic honor societies, religious or professional clubs or societies) organized as a branch or affiliate of a non-George Washington University organization will be recognized by the Committee on Student Life.

## ELIGIBILITY FOR STUDENT ACTIVITIES

Any student registered in The George Washington University is eligible to participate in nonacademic student activities of the University; however, a student having a scholastic average of less than 2.00 is not eligible to be:

1. A member of the Dance Production group, Glee Club, Cheerleaders, Student Council, Religious Council, Panhellenic Council, Interfraternity Council, Engineers' Council, Student Life Committee, or any publications staff.



2. An officer, permanent committee chairman, or member of the executive board of any activity.

The rules and policies of the Southern Conference govern participation in intercollegiate athletics.

#### THE ENGINEERS' COUNCIL

The Engineers' Council is the student governing body for the School of Engineering, composed of two elected representatives from each year class and from the graduate student body, one representative from each student organization in the School, the Business Manager of the *Mecheloid*, and the House Manager of the Davis-Houghtons House. The purpose of the Council is to provide liaison between the student body of the School of Engineering and the Faculty, Administration, and Student Government of the University in all matters affecting the general interests and welfare of the student body, the School of Engineering, or the University. The Council is maintained financially by the Engineers' Council Fee paid by each student in the School of Engineering, and sponsors the engineer student magazine, *Mecheloid*; the Annual Engineers' Mixer, Engineers' Ball, Engineers' Banquet, and the Annual Christmas Tree Ceremony in the University Yard. Council meetings are open to all students in the School of Engineering.

The Council acts as the directing body for *Mecheloid*, the engineers student magazine. The magazine is published six times a year and is sent free to all engineering students. It includes campus and alumni news, a calendar of events, news of the student organizations, and articles on engineering by students and faculty members. The magazine is published by a student Board of Editors and a volunteer student staff.

The control and administration of all student activities are outlined in a separate bulletin.

#### SPORTS ACTIVITIES

The University is a member of the Southern Conference and the National Collegiate Athletic Association. Its teams participate in intercollegiate contests in football, basketball, baseball, tennis, golf, rifle, sailing, and crew.

The University maintains a complete program of intramural sports for both men and women. The Intramural Council, Women's Athletic Association, and Interarsity Athletic Board, cooperate with the departments of Physical Education in conducting this University program and the informal extra-mural sports program.

Other sports activities include the Fencing Club, Sailing Association, and Rowing Club.

## ARTS

The University offers an opportunity for interested students to participate in dance, drama, and music through the following organizations: Dance Production Groups I, II, III; University Dramatic Production Group; and University Glee Club. Each of these groups presents programs during the academic year.

With the cooperation of the Curator of Art, an annual student art exhibit is presented.

## ANNUAL EVENTS

*Colonial Program.*—The Student Council sponsors a series of ten cultural programs to which all students are invited.

*Recreation Program.*—The Student Council and the Dance Production Groups arrange dances, square, folk, and social—at frequent intervals for all students.

*Homecoming.*—Scheduled about the middle of the Fall Semester. Homecoming is the primary festive period of the school year. It includes the annual Pop Rally and Variety Show, the homecoming football game, and the homecoming dance.

*The Winter Weekend.*—In true March Grass spirit, this function includes a jazz concert and a masquerade ball.

*The Activities Fair.*—Early in the Spring Semester, all campus activities entertain the freshmen in the Lower Lounge of Lisner Auditorium with exhibits and demonstrations. Here new students meet older students with similar interests.

*Career Conference.*—Under the sponsorship of the Student Council, guest speakers from many professions explore annually with students the potentialities of vocations available on graduation.

*May Day.*—This is the traditional time for the award of honors in student activities. Mortar Board and Omicron Delta Kappa announce and present their new members.

*The Colonial Cruise.*—An afternoon and evening cruise on the Potomac in the late spring. Students, alumni, and faculty picnic, dance, and engage in games and athletic contests.

## STUDENT ORGANIZATIONS

## HONOR SOCIETIES

*Sigma Xi.*—A national scientific honor society, the purpose of which is to encourage original investigation in science pure and applied. Outstanding graduate students in the sciences are eligible for full membership, and undergraduates who have shown marked ability in research may be elected to associate membership.

*Omicron Delta Kappa.*—A national fraternity emphasizing leadership in extra-curricular activities.

*Order of Scarlet*.—A service honorary society for sophomore and junior men.

*Phi Eta Sigma*.—A national fraternity established to encourage and reward high scholarship and attainment, membership in which is limited to those freshman men who attain a scholastic average of at least 3.50.

*Sigma Tau*.—A national engineering fraternity, the purpose of which is to recognize scholarship and professional attainment.

#### PROFESSIONAL ORGANIZATIONS

*American Society of Civil Engineers (Student Chapter)*.—Membership open to students who are candidates for a civil engineering degree or the degree of Bachelor of Science in Engineering.

*American Institute of Electrical Engineers—Institute of Radio Engineers (Student Chapter)*.—Membership open to candidates for an electrical engineering degree.

*American Society of Mechanical Engineers (Student Chapter)*.—Membership open to candidates for the degree of Bachelor of Mechanical Engineering.

*Theta Tau (Gamma Beta Chapter)*.—A national professional (engineering) fraternity. Membership by invitation to outstanding students who have completed successfully at least the freshman year in the School of Engineering.

#### SOCIAL FRATERNITIES

Sigma Chi, Kappa Sigma, Phi Sigma Kappa, Sigma Alpha Epsilon, Sigma Phi Epsilon, Phi Alpha Sigma Nu, Alpha Tau Kappa Epsilon, Pi Kappa Alpha, Tau Epsilon Phi, Alpha Epsilon Pi, Delta Tau Delta, Kappa Alpha.

#### SOCIAL SORORITIES

Pi Beta Phi, Chi Omega, Sigma Kappa, Alpha Delta Pi, Delta Zeta, Kappa Delta, Phi Sigma Sigma, Zeta Tau Alpha, Kappa Kappa Gamma, Delta Gamma, Kappa Alpha Theta.

#### RELIGIOUS ORGANIZATIONS

Baptist Student Union, B'nai Brith Hillel Foundation, Canterbury Club, Christian Science Organization, Lutheran Student Association, Newman Club, Religious Council, Student Christian Fellowship, Wesley Club, Westminster Foundation.

#### STUDENT PUBLICATIONS

*Amicus Curiae* (Law School publication), *The Cherry Tree* (the annual), *The University Hatchet* (weekly newspaper), *The George Washington Late Review*, *Mechanic* (engineers' publication), *The Perculator* (pharmaceutical publication).



## OTHER ORGANIZATIONS

Alpha Theta Nu (scholarship winners), Big Sisters, Cheerleaders, Colonial Boosters, Current Events Club, Flying Sponsors, Interfraternity Council, Interfraternity Pledge Council, Inter-law Fraternity Council, International Relations Club, International Students' Society, Junior Panhellenic Association, Old Men, Senior Panhellenic Association, Strong Hall Council, Student Council, Student Legal Aid Society, Wandering Greeks.

## ADMISSION

The School of Engineering accepts men and women.

Students may enter The School of Engineering at the beginning of the fall semester, the spring semester, or the Summer Sessions.

## GENERAL ADMISSION REQUIREMENTS

The following factors are considered in determining the eligibility of an applicant for admission:

1. The adequacy of previous academic work as preparation for the course of study now contemplated, including quantity and quality of work and the standing at the institution in which it was done.
2. Results of specified tests, when prescribed by the Committee on Admissions.
3. The aptitude of the student for the course contemplated.
4. The character of the student.

The University reserves the right to refuse admission to any student who has a previous academic record of such grade as to create doubt of his ability to pursue college work successfully, or who, for any other reason, would not be a desirable student.

## APPLICATION FOR ADMISSION

An applicant for admission must obtain from the Office of the Director of Admissions an application blank which he must fill out completely and return with the application fee of \$4. A recent photograph, with signature, of the applicant must be attached to the blank.

*Applications should be filed not later than July 1 for the fall semester, January 1 for the spring semester, and May 1 for the Summer Sessions.*

*An applicant from a secondary school must send the high school record form provided by the University to his high school principal with the request that the principal fill out the form and mail it directly to the Office of the Director of Admissions.*

*An applicant who has previously attended an institution of higher learning must request the registrar of that institution to mail directly to the Office of the Director of Admissions a transcript of his record. If*

he has attended more than one such institution he must request the registrar of each institution to send to the Office of the Director of Admissions a transcript of his record, *even though credits were not earned*, together with an honorable dismissal from the institution last attended.

The Graduate Record Examination administered by the Educational Testing Service, Princeton, New Jersey, is accepted as supplemental evidence of the applicant's educational attainment, and the appropriate report should accompany the application for admission whenever available.

#### METHODS OF ADMISSION

##### FROM SECONDARY SCHOOLS

An applicant from a secondary school may seek to qualify for admission by certificate or examination.

##### BY CERTIFICATE

A certificate of graduation with a minimum of fifteen "units"\* from an accredited secondary school and the recommendation from the principal of the secondary school that the applicant is prepared to undertake college work will be considered subject to the following conditions:

1. If the school is accredited by the regional accrediting association, the student must rank not lower than the fourth fifth of his class.
2. If the school is not listed by the regional accrediting association, but has been accredited by the state accrediting agency, the student must rank in the upper three fifths of his class.

##### By College Entrance Board Examinations

An applicant may qualify by passing satisfactorily College Entrance Board examinations as prescribed by the Director of Admissions. These examinations are given at a large number of examination centers throughout the United States, including Washington, D. C., on May 18, August 14, and December 7, 1957, and January 11, February 8, March 15, May 17, and August 13, 1958.

Arrangements for the examinations should be made with the College Entrance Examination Board, Post Office Box 992, Princeton, New Jersey, not less than one month before the date of the examinations.

##### FROM HIGHER INSTITUTIONS†

An applicant for advanced standing may be considered for admission upon the presentation of satisfactory credentials from an accredited

\* A unit represents a year's study in a secondary school subject, including in the aggregate not less than 120 forty-minute periods of prepared classroom work.

† The School of Engineering has credit in other advanced study, at which, in part, or in full, it previously held. Credit so given may be withdrawn for advancement toward work.

institution of higher learning. The student must be in good standing as to scholarship and conduct, and must be eligible to return to the previously attended institution in the semester for which he seeks admission to this University.

If the transcript of record from such an institution includes the record of his secondary school work, it is not necessary for the applicant to have forwarded a separate record directly from the principal of the secondary school. High school work is considered only as fulfilling entrance requirements; it is never credited toward advanced standing.

Properly certified courses taken at accredited colleges or universities may be applied toward a degree at this University, subject to the curriculum requirements and regulations of the school or college to which admission is sought. Work of low pass grade (such as *D* or the equivalent) will not be considered for transfer.

#### ENTRANCE REQUIREMENTS

##### FOR UNDERGRADUATE STUDY

*For the Degrees of Bachelor of Civil Engineering, Bachelor of Industrial Engineering, Bachelor of Mechanical Engineering, Bachelor of Science in Engineering.*—An acceptable certificate of graduation from an accredited secondary school or the satisfactory passing of College Entrance Board examinations in secondary school subjects selected with the approval of the Director of Admissions is required.

Nine and one-half of the fifteen units required for entrance must be distributed as follows: three in English, two in algebra, one in plane geometry, one-half in plane trigonometry, one in physics or chemistry, and two in one foreign language or history. A graduate of an approved high school who does not offer for admission the particular subjects required for the engineering curriculum, but who does present not less than fifteen acceptable units, may be admitted on admission. If such deficiency in the distribution of units does not exceed two units.

Advanced standing may be granted for work successfully completed at accredited institutions of higher learning. Credit will be assigned by the School of Engineering to the extent that the work taken at previous institutions meets the requirements for the degree sought at this University, and subject to the general University regulations concerning satisfactory subsequent work.

##### FOR GRADUATE STUDY

Application for admission to study toward a graduate degree must be made to the Committee on Graduate Studies, through the Director of Admissions of the University.

A capacity for productive study in the chosen discipline and acceptable personal qualities, as approved by the Committee are required.



*For the Degree of Master of Science in Engineering.*—The student wishing to enroll in the Master of Science in Engineering program is required to have a Bachelor's degree from a recognized institution, a record which gives evidence of adequate preparation for graduate study in engineering, or must qualify by specified examination. Persons not meeting these requirements may be admitted to the Division of Special Students to take prescribed undergraduate courses in Engineering in order to qualify for graduate study in the School of Engineering.

*For the Degree of Master of Engineering Administration.*—The student wishing to enroll in the Master of Engineering Administration program is required to have a Bachelor's degree in engineering or science from a recognized institution, have had some supervisory or administrative experience, and give evidence of preparation adequate for graduate study in this field. Persons not meeting these requirements may qualify by specified examination.

*The Professional Degrees—Civil Engineer, Electrical Engineer, Mechanical Engineer.*—Application may be made not sooner than three years after graduation from this University provided the candidate can demonstrate definite responsibility for engineering work of substantial importance. Application must be made to the Dean. The applicant must be a graduate of the School of Engineering of The George Washington University.

## REGISTRATION

Before a student may be admitted to registration he must have satisfied the Office of the Director of Admissions that he is qualified to enter the University.

A student who has previously matriculated in the University, but who has not been in attendance during the semester prior to registration, should file an application for readmission in advance of registration.

Registration is for the semester unless otherwise indicated on the registration paper. No registration is accepted for less than a semester or one summer session.

A student may not register concurrently in The George Washington University and another institution without the permission of the Dean. Allowance of credit for work done concurrently will be at the discretion of the Committee on Admission and Advanced Standing.

Registration in the University entitles each student to the following University privileges: (1) the issuance of one certified transcript of record, if and when desired; (2) the services of the Placement Office; (3) the use of University library facilities, except as otherwise designated; (4) gymnasium privileges; (5) admission to all athletic contests, unless otherwise specified; (6) subscription to the *University Hatchet*, the student newspaper; (7) admission to University debates; (8) med-

FEES AND FINANCIAL REGULATIONS

Application fee, charged each applicant for admission, non-refundable		\$5.00
<b>Tuition Fees:</b>		
For each semester hour* for which the student enrolls (except for courses in Departments of Instruction in the School of Engineering for courses in the College of General Studies, and for work toward a Master's degree in Engineering).....		0.00
For each semester hour for which the student enrolls for courses in Departments of Instruction in the School of Engineering.....		0.00
For the degree of Master of Engineering Administration.....		0.00
For work leading to and including the Comprehensive Examination.....		0.00
For the degree of Master of Science in Engineering.....		0.00
For work leading to and including the Comprehensive Examination.....		7.00
Graduation fee.....		1.00
For the Professional degree.....		1.00
An annual fee, one-half (50 cents) in advance for the cost of each semester's Scholastic Record (one yellow printed for admission).....		1.00
Graduate Record Examination fee (the same one chargeable for each candidate for a Bachelor's degree at the time of enrollment for the third semester).....		2.00
Late registration fee, charged each student who fails to enroll within the designated period.....		2.00
Change fee, charged each student for each change in program made after at least two semesters.....		2.00
Withdrawal fee, charged each student who permanently and voluntarily quits at the regular registration.....		2.00
Service fee, charged each student for late payment of tuition.....		2.00
Readmission fee, charged each student who is readmitted after suspension for delinquency in law.....		2.00
Readmission fee, charged each student wishing to re-enroll in the university during one semester of absence from the University or after suspension of student requirements.....		2.00
For special research examination.....		2.00
Engineering Council fee, charged each student in the School of Engineering for each semester in one year through which the student enrolls.....		2.00
For each examination to qualify for advanced standing work for each special examination.....		2.00
Laboratory checkout fee, charged each student in advanced courses who fails to check out of the laboratory by the time set by the instructor.....		2.00
Transcript fee, charged for each transcript of record after the first.....		2.00

1. When a teacher attempts to control a group of students, the teacher must first establish a rapport with the students. This can be done by using a variety of techniques, such as smiling, making eye contact, and using a friendly tone of voice. The teacher should also use positive reinforcement to encourage good behavior and discourage bad behavior. This can be done by praising students for good work and using a variety of rewards, such as stickers, certificates, and extra time. The teacher should also use a variety of strategies to manage the classroom, such as setting clear rules and expectations, using a variety of seating arrangements, and using a variety of instructional materials. Finally, the teacher should use a variety of assessment techniques to monitor student progress and adjust instruction as needed.

### Additional Course Fees

In certain courses additional fees, such as laboratory and material fees, are charged as indicated in the course descriptions. These fees are charged by the instructor and, when charges are incurred, may be included in their payments when the tuition is paid in this manner. Breakage of apparatus is charged against the individual student. When breakage is in excess of the normal amount provided for in the laboratory fee the individual student will be required to pay such additional charges as are determined by the department concerned.

### PAYMENT OF FEES

All fees are payable at the Office of the Cashier, 725 Twenty-first Street NW. No student is permitted to complete registration or to attend classes until all fees are paid. Fees for each semester are due and payable in advance at the time of registration.

In exceptional cases, subject to the approval of the Treasurer, the student may sign a contract for semester charges, except for fees payable in advance, permitting payments as follows:

*Fall Semester*.—One third at the time of registration; one third on November 1; one third on December 2.

*Spring Semester*.—One third at the time of registration; one third on March 1; one third on April 1.

A student who fails to meet payments when due, but who pays his fees on or before the fifteenth of the month in which payment is due, is charged a service fee of \$2. A student who fails to meet payments by the fifteenth of the month in which payment is due will be automatically suspended and may not attend classes until he has been officially reinstated and has paid all accrued fees and a reinstatement fee of \$5.

A student suspended for failure to meet payments when due may not be reinstated for the semester after two weeks from the date of suspension. Applications for reinstatement are to be made to the Office of the Cashier.

An auditor pays all fees chargeable to the student registered for credit except the late registration fee.

### WITHDRAWALS AND REFUNDS

Application for withdrawal from the University or for change in class schedule must be made in person or in writing to the Dean. Notification to an instructor is not an acceptable action.

A student may not withdraw from either the basic course (2 years) or the advanced course (2 years) of the Air Force ROTC without the approval of the President of the University.

In authorized withdrawals and changes in schedules, financial adjustments will be made as follows:

*Fall Semester*.—Withdrawal dated on or before October 31, cancella-



tion of two-thirds of tuition charges; withdrawal dated on or before November 30, cancellation of one-third of tuition charges. No refund or reduction will be allowed on a withdrawal dated subsequent to November 30.

*Spring Semester.*—Withdrawal dated on or before February 28, cancellation of two-thirds of tuition charges; withdrawal dated on or before March 31, cancellation of one-third of tuition charges. No refund or reduction will be allowed on a withdrawal dated subsequent to March 31.

In no case will a refund be made of the first third of the total tuition charges unless the registration is in advance and is cancelled before the regular registration fee. In this case a withdrawal fee of \$5 is charged and tuition fees refunded. In no case will tuition be reduced or refunded because of nonattendance upon classes.

Payment applies only to the semester for which a registration charge is incurred and in no case will this payment be credited to another semester.

Any student in chemistry who fails to check out of the laboratory on or before the date set by the instructor, unless excused by the instructor, will be charged a checkout fee in the amount of \$4. A student who drops a course before the end of the semester must check out of the laboratory at the next regular laboratory period.

Any student enrolled in the Air Force ROTC who fails to turn in uniforms, equipment, and textbooks on separation from the Corps will be charged the value of the missing items.

Authorization to withdraw and certification for work done will not be given a student who has not a clear financial record.

## SCHOLARSHIPS, PRIZES, FINANCIAL AID

### SCHOLARSHIPS

Scholarships are awarded for the academic year unless otherwise specified and are credited in equal parts for each semester. Each student must carry the full year school schedule during the period for which the scholarship is awarded. Except in the case of the School of Engineering Scholarships, the General Motors College Scholarship, the Epsilon and Alpha Epsilon, the General Motors College Scholarship, the Epsilon and Alpha Epsilon, the Student Activities Scholarships, and the Texaco Scholarship, the applicants must have established an academic record in courses at this institution, and should apply on prescribed forms which must be filed in the Office of the Chairman of the Committee on Scholarships not later than April 1 preceding the academic year for which the scholarship is to be awarded. Further information may be obtained from the Chairman of the Committee on Scholarships.

*School of Engineering Scholarships.*—Four scholarships are available

each year in the School of Engineering to graduates of accredited secondary schools. The holders of these scholarships must carry a full program in the School of Engineering.

Each scholarship is a full tuition scholarship but does not cover special fees. Each scholarship is for four academic years (summer work is not to be included), provided the holder thereof meets all academic and other standards of the University.

To retain a School of Engineering scholarship, an average of *B* and a satisfactory standard of department must be maintained. In case a student marries after the award is made, the scholarship is forfeited. If for any reason a holder of a School of Engineering scholarship resigns or is dropped from said scholarship, the scholarship remains unfilled.

*Emma K. Carr Scholarships*.—Six scholarships in the amount of \$400 each and ten of \$400 each, established in 1912 by Mrs. Emma K. Carr, are available to "young men (of the white race) for undergraduate or postgraduate work, considering character, capacity, and need."

*Henry Harding Carter Scholarship*.—This scholarship, in the amount of \$500, established in 1896 by Mrs. Maria M. Carter in memory of her husband, Henry Harding Carter, is available to a deserving student who is preparing for the civil-engineering profession.

*Maria M. Carter Scholarship*.—This scholarship, in the amount of \$100, established in 1871 by Mrs. Maria M. Carter, is available to a young man.

*Isaac Davis Scholarship*.—This scholarship, in the amount of \$80, was established in 1869 by the Honorable Isaac Davis of Massachusetts. Nominations for the scholarship may be made "to the founder or his eldest lineal descendant". In case no such nomination is made, the scholarship is to be awarded by the University.

*Henry Parsons Erwin Scholarship*.—This scholarship, in the amount of \$200, established in 1935 by Mrs. Helen B. Erwin as a memorial to her husband, Henry Parsons Erwin, a former Trustee of the University, is available for a student in Engineering.

*General Motors College Scholarship*.—This scholarship, established in 1935 by General Motors Corporation, is available for an incoming freshman student who is a citizen of the United States and demonstrates outstanding talent, high personal qualifications, and financial need. The amount of the award has been made flexible and will range from an honorary award of \$200, up to an award of \$1,000 per year, depending upon the demonstrated need of the individual. It is renewable for the four years of undergraduate work, provided the student continues to meet the high standards established for the holder of this award.

*Hazeltun Scholarship*.—This scholarship, in the amount of \$150, established in 1930 by the bequest of Lillie S. Hazeltun, is awarded annually "for the use and sustenance of needy and worthy students".

*Eugene and Agnes E. Meyer Scholarships.*—A scholarship fund, in the amount of \$2,500, established in 1952 by the Eugene and Agnes E. Meyer Foundation, is available annually "to assist promising students or applicants in meeting the costs of furthering their education, with preferential consideration to children of persons who are employed in public service, including service in the armed forces or the judiciary."

*David Spencer Scholarship.*—This scholarship of \$175, established in 1918 by Miss Louisa J. Spencer, is available under certain restrictions.

*The Zonta Club of Washington, D. C., Scholarship.*—This scholarship, in the amount of \$500, offered by the Zonta Club of Washington, D. C., is available to a woman who is a senior or graduate student with special interest in a professional or business career.

#### THE COLUMBIAN WOMEN SCHOLARSHIP FUNDS

The Columbian Women Scholarships are awarded by the Scholarship Committee of the Columbian Women. Applications for these scholarships should be addressed to the Chairman of the Scholarship Committee, the Columbian Women, The George Washington University, Washington 6, D. C., not later than May 15 preceding the academic year for which the scholarship is to be awarded, or, in the case of award for the spring semester, not later than January 1.

*Nellie Maynard Knapp Scholarship Fund.*—The income from this fund of \$5,000, established in 1915 in memory of a former president, Mrs. Martin A. Knapp, is available for scholarships for women.

*Foundress of Columbian Women Scholarship Fund.*—The income from this fund of \$5,000, established in 1920, is available for scholarships.

*Lillian Young Heaton Scholarship Fund.*—The income from this fund of \$5,000, established in 1925 and named in 1930 in memory of a former president, is available for scholarships.

*College Women's Scholarship Fund.*—The income from this fund of \$500, established in 1926 by the College Women's Club of Washington, D. C., is available for scholarship aid.

*Grace Ross Chamberlain Scholarship Fund.*—The income from this fund of \$2,300, established in 1932 in honor of a former president, is available for scholarship aid.

*Janet M. William Scholarship Fund.*—The income from this fund of \$1,000, established in 1934 in honor of a former president, is available for scholarship aid.

*Rose Lee Hardy Foundation Scholarship Fund.*—The income from this fund of \$2,000, established in 1937 in memory of Rose Lee Hardy, an alumna of the University, is available for scholarship aid.



## PRIZES

*Alpha Chi Sigma Prizes.*—Alpha Pi Chapter of Alpha Chi Sigma Fraternity offers annually the following prizes:

A "Handbook on Chemistry and Physics" is awarded to each of the three students who carry at least eighteen semester hours during the freshman year and attain the highest averages in freshman chemistry.

The name and year of graduation of the student who has attained the highest quality point index in courses in chemistry will be inscribed on a bronze plaque. The winner must have had at least sixteen hours of chemistry including the final semester at The George Washington University.

*Alpha Delta Pi Prize.*—Alpha Pi Chapter of Alpha Delta Pi Fraternity offers an annual prize of \$10 to the woman member of the junior class with the most outstanding record in scholarship, extra-curricular activities, and service to the University.

*American Institute of Chemists Prize.*—The District of Columbia Chapter of the American Institute of Chemists offers an annual prize of a medal and junior membership in the American Institute of Chemists to that graduating student, majoring in chemistry, who excels in scholarship and in the personal qualities of integrity and leadership.

*Byrne Thurtell Burns Memorial Prize.*—This prize of \$65 is awarded to the senior majoring in chemistry who shows the greatest proficiency in organic chemistry, as evidenced by a comprehensive examination, and who possesses such qualifications of mind, character, and personality as to give promise of future achievement.

*Wilhe E. Fitch Prize.*—The Wilhe E. Fitch Prize of \$75, established in 1883 by James E. Fitch in memory of his son is awarded annually to a senior student for the best examination in chemistry.

*Martin Mahler Prize in Materials Testing.*—This prize established in 1953 by Martin Mahler consists of a one year membership in the American Society for Testing Materials and is awarded to the upper division or graduate student in engineering who submits the best reports on tests in the Materials Laboratories course with preference given to prestressed concrete tests.

*Mortar Board Prize.*—This prize, consisting of a silver cup, is awarded annually to the woman student in the sophomore class having a scholarship average of B or higher and the most outstanding record in activities.

*Omicron Delta Kappa Prize.*—Alpha Delta Circle of Omicron Delta Kappa Fraternity offers annually a plaque to be awarded to "that member of the senior class who throughout his course has done the most constructive work in the furtherance and upbuilding of the University student activities".

*Phi Eta Sigma Prize.*—The George Washington University Chapter of Phi Eta Sigma offers annually to the male student attaining the

highest scholastic average in his first full semester of work, a choice book selected from the field of the recipient's major interest. The winner's name will be engraved on a plaque in the Office of the Dean of the Junior College.

*Pi Beta Phi Prize.*—A prize of \$20 is awarded annually by the District of Columbia Alpha Chapter of Pi Beta Phi Fraternity to that woman member of the senior class who throughout her college course has done the most constructive work in the promotion of student activities among the women of the University.

*Ruggles Prize.*—The Ruggles Prize of \$35, established by Professor William Ruggles in 1892, is awarded annually to a candidate for a baccalaureate degree for excellence in mathematics.

*Sigma Kappa Prize.*—Zeta Chapter of Sigma Kappa Sorority offers an annual prize of \$10 to the student with the highest grade in the final examination in General Chemistry.

*Sigma Tau Prize.*—Xi Chapter of Sigma Tau Fraternity offers annually a medal to be awarded to that member of the freshman class in the School of Engineering who maintains the highest scholastic standing in the work of the entire year.

*James MacBride Sterrett, Jr., Prize.*—This prize, established in 1911 by Professor James MacBride Sterrett in memory of his son, consists of books awarded annually to that student who obtains the highest average in Physics 6, 7, and 8.

*Theta Tau Activities Plaque.*—Gamma Beta Chapter of Theta Tau Fraternity offers annually a plaque to be awarded to that member of the senior class who has the most outstanding record in activities in the School of Engineering during the entire period of his attendance.

*Alexander Wilkinson Weddell Prize.*—This prize of \$100, established in 1921 by Mrs. Virginia Chase Weddell, is awarded annually to a candidate for a degree who writes the best essay on the subject of "the promotion of peace among the nations of the world". The prize essays shall become the property of the University and shall not be printed or published without the written consent of the University. The University reserves the right to withhold the award if no essay attaining the required degree of excellence is submitted.

#### MILITARY AWARDS

*Society of American Military Engineers Gold Medal.*—This medal offered by the Society of American Military Engineers, is awarded annually to selected Air Force ROTC cadets in the next to last year of their engineering course and in the last year of such course. Nominations are made jointly by the Professor of Air Science and the Dean of the School of Engineering, and final selection is made nationally by a board of three senior Air Force officers.

*Arnold Forces Communications and Electronics Association Gold Medal.*—This medal, offered by the Arnold Forces Communications and Electronics Association, are awarded annually to outstanding senior Air Force ROTC cadets majoring in Electrical Engineering who demonstrate outstanding qualities of military leadership and distinguish themselves either academically or by leadership in campus activities.

*Air Force Association Silver ROTC Medal.*—This medal, offered by the Air Force Association, is awarded annually to that cadet who, after completion of Air Force ROTC summer training, is judged to be the outstanding cadet among those who have indicated their intention to apply for flying training upon graduation.

*Reserve Officers' Association Medals.*—Gold, silver, and bronze medals, offered by the Reserve Officers' Association of the District of Columbia, are awarded annually to those cadets enrolled in Air Science III, II, and I, respectively, who receive the highest grades for the current year in the leadership and academic phases of the Air Force ROTC course.

*Chicago Tribune Gold ROTC Medal.*—This medal, offered by *The Chicago Tribune*, is awarded each semester to that cadet enrolled in Air Science IV who has made an outstanding contribution to the effectiveness of the Air Force ROTC program by demonstrating the highest ideals of leadership and scholastic excellence.

*Chicago Tribune Silver ROTC Medal.*—This medal, offered by *The Chicago Tribune*, is awarded each semester to that cadet of the Air Force ROTC Basic Course who has demonstrated outstanding leadership potential and who has maintained excellent scholastic standing in the University.

*Sons of the American Revolution ROTC Medal.*—This medal, offered by the District of Columbia Society, Sons of the American Revolution, is awarded annually to that freshman cadet of each Air Force ROTC flight who demonstrates to the maximum degree traits and qualities of good citizenship and meets the prescribed requirements established by the donor.

*Unit Leadership Trophy.*—This silver trophy, offered by Walter G. Bryte, Jr., Colonel, USAF (Retired), first Professor of Air Science at this University, is awarded annually to the Air Force ROTC flight adjudged best in a competitive review and inspection. The Cadet Commander of this flight is presented a set of engraved Second Lieutenant's insignia.

*The Colonel Cadet Rifle Trophy.*—This trophy, offered by Master Sergeant Jerome Gleason, USAF, first coach of the Air Force ROTC Rifle Team at this University, is awarded to that cadet who is judged to be the outstanding member of the rifle team.

*Arnold Jr. Society Scroll.*—This scroll, offered by the Carl Spatz Squadron of the Arnold Air Society, is awarded annually to the outstand-



ing cadet completing the basic course with a cumulative average of B or better in Air Force ROTC courses.

*Pershing Rifles Gold, Silver, and Bronze Achievement Medals.*—These medals are awarded annually by the National Headquarters to those Air Force ROTC cadets who are Pershing Riflemen and who are judged to be outstanding examples of the ideals of the Pershing Rifles.

*Republic Aviation Award.*—An engraved identification bracelet, offered by the Republic Aviation Corporation, is awarded annually to that cadet enrolled in Air Science III who, in competition, makes the most effective verbal presentation on the Air Power theme.

*The Convair Award.*—A Convair miniature airplane, offered by the Consolidated Vultee Aircraft Corporation is awarded annually to that cadet enrolled in Air Science II who achieves the highest cumulative grade in the basic course and who applies for flight training.

*Reserve Officers' Association Junior Memberships.*—Five junior memberships, offered by the Reserve Officers' Association of the District of Columbia, are awarded annually to the five Air Force ROTC cadets who obtain the highest grades in Air Science III.

*National Rifle Association Club Champion Medal.*—This medal, offered by the National Rifle Association, is awarded to a sophomore, junior, or senior member of the Air Force ROTC Rifle Team judged to be the outstanding member of the team based on marksmanship, participation in team matches, and contribution to the effectiveness of the team.

*National Rifle Association Qualification Medal.*—Three medals, offered by the National Rifle Association, are awarded annually to members of the Air Force ROTC Rifle Team qualifying as Expert, Sharpshooter, or Marksman in indoor rifle firing.

*Air Force ROTC Rifle Team Awards.*—Trophies, plaques, and medals are awarded annually to Air Force ROTC Rifle Teams through successful competition in the following:

- The Air Force ROTC Liaison Area Championship Matches.
- The Army and Area Intercollegiate and Inter-scholastic Matches.
- The Secretary of the Air Force ROTC Rifle Match.
- The William Randolph Hearst National ROTC Rifle Matches.

## FINANCIAL AID

### LOAN FUNDS

The following loan funds are available to students in the University in accordance with the qualifications placed thereon by the donors. Inquiries should be directed to the Office of the Treasurer.

*University Loan Fund.*—The Trustees of The George Washington University have established a loan fund of \$10,000.

*Henry Strong Educational Foundation.*—The Henry Strong Educational Foundation, established at Chicago under the will of General Henry Strong, makes available a fund for loans to both men and women students under the age of twenty-five years.

For information concerning full- and part-time employment, see "The Placement Office", page 24.

### REGULATIONS

A student enrolled in the School of Engineering is required to conform to the University regulations and to comply with the rules and regulations of the School of Engineering.

A student who withdraws or is suspended, or is otherwise absent from the University for one semester or more, may re-enter and complete his work only under the rules and regulations in force at the time of his return.

If a student knowingly makes a false statement or conceals material information on an application for admission, registration card, or any other University document, his registration may be canceled and he will be ineligible (except by special action of the Faculty) for subsequent registration in any unit of the University.

### ATTENDANCE

A student is not permitted to attend classes until registration has been completed and fees due have been paid. Regular attendance is required. A student may be dropped from any course for undue absence.

A student who has been suspended, either for delinquency in payment of fees or for any other reason, is not permitted to attend classes during the period of suspension.

The student is expected to attend every meeting of the course in which he is registered, fully prepared to carry on the work required. The student is held responsible for all work in the course, and all absences must be excused before provision will be made for him to make up the work missed. Excuses for absences from examinations which have been announced in advance can be obtained only by making written application to the instructor in charge of the course.

### AMOUNT OF WORK

Eighteen semester hours, exclusive of physical education requirement, constitute normal full-time work. Nine semester hours constitute normal part-time work.

A full-time student who is not on probation may take ordinarily not

more than nineteen semester hours. A student employed more than twenty-four hours a week, who is not on probation, may take ordinarily not more than ten hours. A student whose quality point index is 2.00 or higher may be permitted by the Dean to exceed these limits by not more than two hours.

A student previously unemployed who secures employment subsequent to registration or at any time during a semester is required to report that fact immediately to the Dean in order that adjustments in schedule may be made, if necessary, to bring his program within the Faculty's limitations upon the amount of work to be carried by an employed student.

#### ADVISORY SYSTEM

Every student entering the School of Engineering as a degree candidate is assigned a permanent Faculty adviser for the purpose of guiding the educational career of the student, providing assistance in his professional development as an engineer, establishing close relations between the Faculty and the student, and furnishing counsel and advice in all phases of the academic career of the student.

Faculty advisers counsel students on their programs of study, the achievement and maintenance of satisfactory scholastic performance, professional development, extra-curricular activity as part of the educational process, and assist the entering student in orientation in the engineering discipline. The adviser represents the student in all cases requiring Faculty action.

Students who have not completed 70 semester hours satisfactorily are required to obtain their advisers' approval of programs of study prior to registration.

A student who has not completed the course work specified for the freshman and sophomore years is required to consult his adviser when so directed by the Dean, and to follow the recommendations of his adviser in all academic matters. However, advisers may not deny a student entry into any course or activity to which he is entitled under the regulations of the School of Engineering. Students having junior or senior status are encouraged to consult their advisers. The Dean acts as temporary adviser to entering or transfer students pending assignment of their permanent advisers.

All students are encouraged to discuss college problems with their advisers or instructors at any time; and parents or guardians are invited to consult with the Dean and advisers, concerning any student problems.

Faculty advisers discharge their counseling duties in accordance with the high principles of their professional responsibility; however, the final responsibility for a student's action lies wholly with the student.



## SCHOLARSHIP REQUIREMENTS

A student who fails to maintain the scholarship requirements of the School of Engineering may be dismissed from the University.

## GRADES

Grades are not given out by instructors but are mailed to the student through the office of the Registrar at the close of each semester. Upon request, a copy of the student's grades will be forwarded to his parent or guardian.

The following grading system is used: excellent, *A*; good, *B*; average, *C*; passing, *D*; failing, *F*. Whenever a grade has not been assigned, the symbol *In.* (incomplete) or the symbol *W* (authorized withdrawal) will be recorded. The symbol *In.* indicates that a satisfactory explanation has been given to the instructor for the student's failure to complete the required work of the course. An "incomplete" can not be made up after the lapse of one calendar year except by permission of the Faculty. Courses from which a student has withdrawn by proper authorization will be indicated by the symbol *W*. No student may repeat for grade a course in which he has received a grade of *D* or above, unless required to do so by the department concerned.

For graduate work, grades are indicated as "excellent", "satisfactory", "unsatisfactory".

## QUALITY POINT INDEX

Quality points are computed from grades as follows: *A*, four points; *B*, three points; *C*, two points; *D*, one point; *F*, no points, for each semester hour for which the student has registered.

Scholarship is computed in terms of the quality point index, obtained by dividing the number of quality points by the number of semester hours for which the student has registered, both noted on the complete collegiate record. Courses marked *W* or *In.* are not considered in determining the index, except that courses marked *In.* will be considered when a formal grade is recorded, or at the close of a calendar year, whichever occurs first. If an "incomplete" is not surrendered by a proper grade within the allotted time, it is computed as zero quality points. Grades in courses taken at another institution are not considered in computing the quality point index. Grades in courses taken to satisfy entrance requirements, and in physical education and secretarial studies courses are not considered in computing the quality point index.

## SCHOLARSHIP

In order to graduate, a student must have a general quality point index of at least 2.00 and, in addition, a quality point index of at least 2.00 in all work accepted for the degree in the School of Engineering.

*Probation.*—A student must maintain a quality-point index of at least 2.00, or be placed on probation. A student remains on probation as long as his quality point index is below 2.00, or until his probation is removed by the Committee on Scholarship.

Probation is imposed for the amount of time required to complete a minimum of twelve additional semester hours or for one semester, whichever is greater. In certain circumstances the period of probation may be extended. A student on probation may not hold office or participate in the activities of any student organization or represent the School in any undergraduate competition.

Students placed on probation for scholastic deficiency are required to complete diagnostic counseling tests and remedial study as prescribed by the Committee on Scholarship.

*Suspension.*—A student who has a quality point index equal to or below 1.00 will be suspended. A student who becomes subject to probation for the third time, whether successive or after an interval, will be suspended.

A student suspended for poor scholarship may apply for readmission after an interval of one calendar year. He must then submit evidence to the Committee on Admission and Advanced Standing that during his absence from the University he has so conducted himself as to indicate that he will profit by readmission and, in addition, must complete diagnostic counseling tests and remedial study as prescribed by the Committee. A student suspended twice for poor scholarship will not be readmitted.

The foregoing scholarship regulations are applied when a student has completed a minimum of twelve semester hours of work. Thereafter, the regulations are applied in multiples of twelve semester hours.

#### ACADEMIC DISHONESTY

Evidence of dishonesty on the part of any student will result in his suspension from the University upon the recommendation of the appropriate dean's council.

A student found guilty of dishonesty will be deprived of credit for all courses in the semester during which the dishonest act occurs.

A student may apply for readmission to the University after the expiration of not less than one calendar year from suspension. Action upon such application will be taken by the Dean's Council. The Dean's Council will recommend to the President that a student suspended twice for dishonesty will not be readmitted.

#### CHANGES IN PROGRAM OF STUDIES

A student may not change or drop courses or change his status to that of auditor except with the approval of the Dean of the School upon presentation of adequate reasons for such changes.

Change from one section to another of the same course or from one major subject to another within the School may be made with the approval of the Dean. All requirements specified in the course of study to which the change is made must be satisfied.

Transfer from one college, school, or division to another may be made only with the approval of the deans concerned. Applications for such change should be made on the proper form, obtainable in the Office of the Director of Admissions, where it should be filed.

Withdrawal from a course or from the University, without academic or financial penalty, requires the permission of the Dean. Permission to withdraw from the University will not be granted a student who has not a clear financial record.

*All charges for courses dropped without the approval of the Dean must be met by the student. Repetition of the dropping of a course to an instructor does not effect its discontinuance.*

During the seven days following the first day of classes of a semester, additional courses may be added to the student's program with the approval of the instructor, the student's adviser, and the Dean.

During the thirty-five days following the first day of classes of a semester, courses may be dropped from a student's program, with the approval of the student's adviser and the Dean, and without academic penalty. Withdrawal from a course without the approval of the student's adviser entails a penalty of failure in the course.

Withdrawal from a course or from the University, without academic penalty, may be authorized by the Dean at any time upon presentation of written evidence of extenuating circumstances.

Unauthorized withdrawal from a course at any time entails a penalty of failure in the course and financial responsibility for the full fee for the course.

#### HONORS LIST

The Faculty of the School of Engineering recognizes meritorious scholastic achievement by an Honors List, containing in alphabetical order the names of candidates for undergraduate degrees in engineering whose scholastic achievement satisfies all of the following requirements:

1. The candidate's cumulative quality point index is equal to or exceeds 3.00.
2. At least thirty semester hours of credit have been earned while a degree candidate in the School of Engineering.
3. At least fifteen (part-time student) or thirty (full-time student) semester hours of credit in an engineering degree curriculum have been earned in the two semesters immediately preceding the award.
4. No grade below C has been received during the qualifying period stated above.



5. No disciplinary action has been taken in respect to the student.

The Honors List is prepared at the end of the fall and spring semesters, and displayed in an appropriate public place in the School of Engineering. A notation is made on the student's record each time his name is included in an Honors List.

#### CREDIT

Credit toward a degree is given only after regular registration for and satisfactory completion of the required work of classes in the University, or upon the granting of advanced standing in accordance with the regulations of the School.

On request the Registrar will issue to the student a balance sheet showing the amount of work completed and the requirements, both quantitative and qualitative, remaining to be met for the degree.

#### TRANSCRIPTS OF RECORD

Official transcripts of student records will be forwarded on request to other institutions. Unofficial copies of records will be issued to the student on request. No charge is made for the first transcript, a fee of one dollar is charged for each one thereafter. No certificate of work done will be issued for a student who does not have a clear financial record.

#### SUMMER SCHOOL CREDIT

A student who plans to attend summer school sessions at another institution with the intention of having credits so obtained apply toward graduation from this University must first secure the written approval of the Dean. In no event will such credits be recognized to an amount in excess of that which might be earned in a similar period in this institution.

#### PHYSICAL EDUCATION REQUIREMENTS

Freshmen and sophomores in the School of Engineering are required to take Physical Education 1-2 and 11-12 unless (1) they are registered for less than 9 semester hours, or (2) regular employment during the day makes it necessary to attend classes during the evening hours, or (3) they are enrolled in the Air Force ROTC, or (4) they are veterans.

Any other exemptions will be granted only upon written petition which has been recommended by the physical education department concerned and approved by the Dean of the School.

A student entering the University with advanced standing is not exempt from the physical education requirements unless he has satisfactorily met the requirements elsewhere. Courses in military training are not accepted in satisfaction of these requirements.

The required medical and physical examinations, as specified by the departments of physical education, will be arranged at the time of registration.

### USE OF CORRECT ENGLISH

Any student whose written or spoken English in any course whatever is deemed unsatisfactory may be required by the instructor to do the Dean's Council. The Council may assign supplementary work, without academic credit, varying in amount with the needs of the student. If the work prescribed is equivalent to a course, the regular tuition fee is charged. The granting of a degree may be delayed for failure to make up any such deficiency in English to the satisfaction of the Dean's Council.

### GRADUATION REQUIREMENTS

To be recommended for graduation a student must have met the admission requirement of the School, completed satisfactorily the scholarship, curriculum, residence, and other requirements for the degree for which he is registered, and be free from all indebtedness to the University.

*Application for Graduation.*—Application for a degree should be filed in the Office of the Registrar at the time of registration for the last semester of the senior or final year.

*Curriculum.*—Curriculum requirements for the Bachelor's degrees are stated on pages 52, 56, for the Master's degrees on pages 58, 59 and 61.

*Graduate Record Examination.*—All candidates for Bachelor's degrees are required to take two parts of the Graduate Record Examination in the University's institutional testing program. The examinations are conducted by the University twice a year, the Fall Testing Session (December 7, 1937) for seniors graduating in February, and the Spring Session (April 12, 1938) for those graduating in June or October. Dates of the examinations are announced in the *Schedule of Classes*.

Each senior required to take the Graduate Record Examination must register for it in the office of his dean when he registers for his final regular semester of study (excluding summer sessions). A \$5 examination fee is payable at the time of registration.

Students will receive individual reports of test scores and may avail themselves of the regular transcript services of the Educational Testing Service. By special permission seniors who expect to graduate in June may take the Graduate Record Examination at the previous Fall Testing Session, so as to have transcripts available early in the year when applying for admission to graduate schools.

*Residence.*—For the Bachelor's degrees, a minimum of one year or

thirty-six semester hours must be completed in residence. Summer work may be counted in residence, but in no case may the period of residence aggregate less than thirty weeks. Unless special permission is granted by the Dean to pursue work elsewhere, the work of the senior or final year must be completed in residence.

*Attendance and Conduct.*—The University reserves the right to refuse to confer a degree upon a candidate whose attendance or conduct has been unsatisfactory.

*Master's Problem.*—A comprehensive problem submitted in partial satisfaction of requirements for a Master's degree or a professional degree in engineering must be presented in its final form to the Dean not later than the date specified in the University calendar. Three copies of the problem are required, one typewritten original and two legible and complete carbon copies. Detailed instructions for the styling of all Master's problems should be obtained from the Dean.

Accepted problems with accompanying drawings become the property of the University and are deposited in the University Library, where the duplicate copies are bound and made available for consultation. Permission to publish or adapt material in the problem must be secured from the Dean.

*Prereq. at Graduation.*—A candidate is required to be present at the graduation exercises unless written application for permission to absentia is approved by the Dean.

#### HONORS

*With distinction.*—The degree may be conferred "with distinction" at the discretion of the Faculty, if a student attains a quality-point index of 3.50 or higher on all work taken at this institution except that taken during the semester immediately preceding the granting of the degree. To be eligible for this honor a student must have completed at this institution at least one-half of the work required for the degree.

*Special honors.*—Special honors may be awarded by the Faculty to any member of the graduating class for outstanding achievement in the student's major field of work on recommendation of the major department under the following regulations:

1. The student must have his candidacy for special honors approved by the faculty member representing the major department or field not later than the beginning of the senior year.

2. The student must meet such other conditions as may be set at the time his candidacy is approved.

3. No student will be awarded special honors unless he has a quality-point index of at least 3.00 on all work taken at this institution except that taken during the semester immediately preceding the granting of the degree.



4. To be eligible for honors a student must have completed at this institution at least one-half of the work required for the degree prior to the beginning of the semester immediately preceding the granting of the degree.

*Military honors.*—An Air Force ROTC cadet may be designated a "Distinguished Air Force ROTC Cadet" if he (1) has completed Air Science III with an academic standing among the upper third of the students enrolled therein; (2) has an accumulative academic average of B or better; (3) possesses high moral character and definite aptitude for service in the Air Force; (4) has distinguished himself by demonstrated leadership through participation in recognized extracurricular activities and while in attendance at an Air Force ROTC Summer Training Unit. A "Distinguished Air Force ROTC Cadet" is authorized to wear a "Distinguished" badge centered above the right breast pocket of the uniform. He may submit an application for a regular commission in the United States Air Force, which is given final consideration upon his designation as a "Distinguished Air Force ROTC Graduate".

An Air Force ROTC cadet may be designated a "Distinguished Air Force ROTC Graduate" if he has (1) been designated a "Distinguished Air Force ROTC Cadet" and undergone the standards required of a "Distinguished Air Force ROTC Cadet" during the period between designation and graduation; (2) completed the Air Force ROTC Advanced Course; and (3) completed the requirements for the Bachelor's degree. A "Distinguished Air Force ROTC Graduate" will be presented with a certificate signed by the Commandant, Air Force ROTC, and, if he made application, will be considered for a regular commission in the United States Air Force.

### THE LIBRARY

A student registered in the University is entitled to the reference use of the University Library. The Student Identification Card, issued upon the payment of fees, must be presented as identification.

The loan period for most books available for home circulation is two weeks, with an additional two-week renewal. A fine of five cents will be charged for each day a book is overdue. Any book which does circulate is subject to recall by the Librarian at any time. Reserve books for collateral reading must be used in the reading rooms when the Library is open. With special permission they may be drawn for overnight use when the Library closes. A fine of twenty-five cents will be charged for the first hour or fraction of an hour and five cents for each hour or fraction thereafter that a reserve book is overdue. Grades of a student will be withheld until his library record is clear.

#### HOURS

The University Library is open from 9:00 A.M. to 10:00 P.M. each class day (Saturday 9:00 A.M. to 5:00 P.M.), and from 2:00 to 6:00 P.M. on Sunday.

#### RIGHT TO DISMISS STUDENTS

The right is reserved by the University to dismiss or exclude any student from the University, or from any class or classes, whenever, in the interest of the student or the University, the University Administration deems it advisable to do so.

#### RIGHT TO CHANGE RULES

The University and its various colleges, schools, and divisions reserve the right to modify or change requirements, rules, and fees. Such regulations shall go into force whenever the proper authorities may determine.

#### PROPERTY RESPONSIBILITY

The University is not responsible for the loss of personal property in any University building. A "Lost and Found" Office is maintained in the Student Union.

#### THE BACHELOR'S DEGREES

The Bachelor's degrees are: Bachelor of Civil Engineering, Bachelor of Electrical Engineering, Bachelor of Mechanical Engineering, and Bachelor of Science in Engineering.

The degree of Bachelor of Science in Engineering may be earned with any of the following options: Chemistry, Engineering Administration, Machine Computer, Mathematics, or Physics.

Curricula leading to the degrees of Bachelor of Civil Engineering, Bachelor of Mechanical Engineering, and Bachelor of Electrical Engineering are accredited by the Engineers' Council for Professional Development, the recognized accrediting body of the engineering profession.

#### CURRICULUM REQUIREMENTS

The satisfactory completion of one of the following curricula is required.

Physical Education is required of all students in the freshman and sophomore years. (See "Physical Education Requirements", pages 46-47.)

Variations from the prescribed curricula may be made, with the permission of the Dean's Council. A student desiring to omit a required course and substitute another must make written application to the Dean.





## Bachelor of Civil Engineering

JUNIOR YEAR		Credits
CE 141	Analytical Mechanics: Dynamics	3
CE 145	Engineering Materials	4
CE 332	Fluid Mechanics	3
CE 149/44	Structural Theory and Analysis I and II	8
Math 112	Mathematics for Engineers and Scientists	3
ME 113	Theoretical Thermodynamics I	3
ME 118	Heat Transfer	3
PHYS 112	Electromagnetism	4
*Elective	Approved nondepartmental elective	4

Total ..... 34

ROTC—Air Force ROTC cadetship subsequent Air Science (14-32) (30) Air Force (14).

SENIOR YEAR		Credits
CE 148	Laboratory	3
CE 145	Hydraulic Engineering	3
CE 148	Sanitary Engineering	3
CE 149	Steel and Timber Structures	3
CE 145	Concrete Theory and Design	3
CE 143	Structural Theory and Analysis III	3
CE 334	Structural Dynamics	3
CE 334	Transportation Engineering	3
CE 335	Estimate and Value Planning	3
CE 336	Construction of Mass L.	3
EA 111	Approved nondepartmental elective	3
*Elective	Approved nondepartmental elective	3

Total ..... 34

ROTC—Air Force ROTC cadetship subsequent Air Science (14-32) (30) Air Force (14).

## Bachelor of Electrical Engineering

JUNIOR YEAR		Credits
EE 111	Analytical Mechanics: Dynamics	3
PHYS 2	Principles of Electricity	3
EE 101	Electric and Magnetic Fields	3
EE 104	Fluid Analysis	3
EE 107	Qualitative Circuit Analysis	3
EE 111/12	Electrical Measurements	4
EE 111-54	Electric Power Laboratory	3
EE 119	Alternating-current Machinery	3
Math 112	Mathematics for Engineers and Scientists	3
PHYS 112	Electromagnetism	4
*Elective	Approved nondepartmental elective	4

Total ..... 34

ROTC—Air Force ROTC cadetship subsequent Air Science (14-32) (30) Air Force (14).

\* Credit is not given for courses covered in Physical Education, approved studies, or special studies. Mathematics as prerequisite.

## SENIOR YEAR

Semester  
Hours

CE 132	Fluid Mechanics (Including Laboratory)	3
CE 133-24	Communications Laboratory I and II	4
EE 147	General Network Analysis	3
EE 148	Control System Analysis	3
EE 141-42	Control System Synthesis	4
EE 146	Electromagnetic Waves	3
EE 137	Electronic Circuits	3
EE 152-9	Principles of Chemical Engineering	2
ME 113	Thermodynamics I	3
• Elective	Approved mechanical elective	3

Total 34

ROTC—Air Force ROTC cadets select from Air School 131-52 (6) for Training (6).

## Bachelor of Mechanical Engineering

## JUNIOR YEAR

Semester  
Hours

CE 121	Analytical Mechanics Dynamics	3
CE 145	Engineering Materials	4
CE 172	Fluid Mechanics	3
Math 112	Mathematics for Engineers and Scientists	3
ME 113	Thermodynamics I	3
ME 114	Thermodynamics II	3
ME 115	Heat Transfer	3
ME 120	Physical Metallurgy	3
PHYS 152	Electronics	3
PHYS 151	Nuclear Radiation	3
• Elective	Approved mechanical elective	3

Total 30

ROTC—Air Force ROTC cadets select from Air School 120-2 (6) for Training (6).

## SENIOR YEAR

Semester  
Hours

CE 137	Advanced Mechanics of Materials	3
ME 123	Advanced Dynamics	3
ME 133-35	Heat Power Engineering	6
ME 136	Fluid Machinery	3
ME 141	Production Engineering	3
ME 142	Properties of Compressible Fluids	3
ME 145	Machine Analysis and Synthesis	3
ME 152	Instrumentation	4
• Elective	Approved mechanical elective	6

Total 34

ROTC—Air Force ROTC cadets select from Air School 131-52 (6) for Training (6).

\* There is one year for courses listed in Physical Education. Students should be prepared to study Mathematics at this course.

## Bachelor of Science in Engineering

		Semester Hours
JUNIOR YEAR		
CE 141	Analytical Mechanics-Dynamics	3
CE 145	Engineering Materials	4
CE 142	Fluid Mechanics	3
EE 303	Electric and Magnetic Fields	3
Math 112	Mathematics for Engineers and Scientists	3
ME 120	Physical Mechanics	3
Phys 142	Electricity	3
*Elective	Approved institutional elective	3
Option	As approved by Department of Option	3
Total		27

ROTC—All First ROTC students substitute Air Science 141-2 (5) for Elective (3).

		Semester Hours
SENIOR YEAR		
CE 157	Advanced Mechanics of Materials	3
ME 111	Thermal Thermodynamics I	3
ME 115	Heat Transfer	3
ME 141	Advanced Dynamics	3
ME 142	Instrumentation	3
Option	As approved by Department of Option	17
Total		30

ROTC—All First ROTC students substitute Air Science 151-2 (10) for Option (3).

The Bachelor of Science in Engineering curriculum provides training in the basic physical principles employed in engineering and in engineering methods of analysis, and in addition, offers an opportunity for study in optional fields in which the student has special interest.

Optional study can be selected from the fields of Chemistry, Engineering Administration, Machine Computer, Mathematics, or Physics. The program of study in the option is formulated by the department concerned in conference with the student. The program, bearing the approval of the Executive Officer of the department concerned, must be submitted by the student to the Dean before the beginning of the junior year.

## THE MASTER'S DEGREES

The Master's degrees are Master of Science in Engineering and Master of Engineering Administration.

\*Credit is not given for courses elected in Physical Sciences (Scientific Method, Scientific Method, Mechanics, or Electricity).



### THE DEGREE OF MASTER OF SCIENCE IN ENGINEERING

Upon the satisfactory completion of the requirements of the School of Engineering the degree of Master of Science in Engineering is conferred. The discipline of this degree is designed to lead to a comprehension of scientific principles and methods as they are applied in engineering. It is conceived that this objective can be served best by providing a relationship in which the intellectual needs and desires of the student are an important element in determining the curriculum. To this end the responsibility for the student's program of study is established in a Committee on Graduate Studies composed of members of the University Faculty and other qualified persons. Programs of study are prescribed for each candidate by the Committee on Graduate Studies or an assigned adviser, in accordance with his state of knowledge and needs, and as required to achieve satisfactory understanding of principles and methods. These programs are not curricula common to all candidates for the degree. They may consist of formal courses, independent study, or individual study under assigned faculty, and may include work in several departments and fields of study.

#### Admission

Application for admission to graduate study must be submitted to the Office of the Director of Admissions on the form prescribed by that Office. Applicants with Bachelor's degrees from recognized institutions, and with records which, in the opinion of the Committee on Graduate Studies give evidence of adequate preparation for graduate study in engineering, may be admitted to graduate study. All preparatory work, such as removal of undergraduate deficiencies, is in addition to study at the graduate level. Applicants who have significant deficiencies in their preparation for graduate study may be admitted to the Division of Special Students to pursue prescribed programs of undergraduate study, the completion of which with grades of *B* or higher will qualify them for admission to graduate study in the School of Engineering.

The student is admitted to candidacy for the degree after satisfactory completion of not more than nine semester hours of prescribed graduate courses, or at the discretion of the Committee. The student will be considered from the standpoints of satisfactory completion of the prescribed courses and acceptability of qualifications. Application for admission to candidacy for the degree must be made in writing to the Committee on Graduate Studies. At the time of admission to candidacy, the balance of the candidate's program is established.

#### ADVANCED STANDING

Graduate study completed prior to admission to graduate study in the School of Engineering will not be transferred for credit but will be con-

sidered by the Committee on Graduate Studies in prescribing the candidate's program of study, provided it contributes to the achievement of the objectives of the discipline.

Course work applied to satisfy requirements for another degree may not be applied to satisfy requirements for the graduate degree in engineering.

#### REQUIREMENTS FOR THE DEGREE

The candidate for the degree must complete a minimum of one year of full-time study, or the equivalent in part-time study, under the guidance of the Committee on Graduate Studies; complete the program prescribed by that Committee, including course examinations; submit an acceptable Master's problem; and demonstrate, by passing a comprehensive examination, substantial understanding of scientific principles and methods of their use in the area of his interest. The examination may be written, oral, or both, at the discretion of the Committee.

All of the work applied toward this degree must be accomplished under the guidance of the Committee on Graduate Studies.

The grade of "Satisfactory" is required in all courses of instruction. The student with one grade of "Unsatisfactory" may repeat the course once or may appeal to the Committee for guidance. The student who receives two or more grades of "Unsatisfactory" is not permitted to enroll further in the School of Engineering. A student barred for poor scholarship may apply to the Committee on Graduate Studies for readmission. He must demonstrate to the Committee, by examination, that deficiencies in course work have been removed. No student will be permitted to take the comprehensive examination until he has received the grade "Satisfactory" or higher in all work in his program, and has submitted an acceptable Master's problem.

The main purposes of the Master's problem are to demonstrate the student's individual ability to make independent use of the knowledge and discipline of thought acquired in his graduate study, and to furnish objective evidence of his constructive powers in his chosen field. The work must be carried out under faculty supervision and a presentation in written essay form is required. Work of a suitable character for which the student has professional responsibility may be considered for the Master's problem whether done on or off campus, provided no substantial amount of work is completed without faculty supervision.

The candidate must complete the requirements for the degree within three years, if he is a full-time student; within five years, if he is a part-time student.

#### Program of Study

A program of study consisting of at least twenty-four semester hours of graduate courses to prepare the candidate for his comprehensive

examination is formulated from the following areas with particular attention to the individual student's needs and objectives. The program may provide for broad coverage in a variety of fields or may be designed to give some degree of specialization in a particular area, as determined by conference with the Committee at the time of admission to candidacy.

*Prescribed Courses.* Upon admission to graduate study, courses in the following areas must be taken prior to application for admission to candidacy for the degree: Analysis of Engineering Systems, Analytical Mechanics, a choice of one or two courses in the areas marked by an asterisk in the Fundamental Engineering Group.

After admission to candidacy for the degree, the balance of the program may be arranged in consultation with the Committee on Graduate Studies from the following groups:

#### BASIC GROUP

Mathematics: Theory of Functions of a Complex Variable, Mathematical Statistics, Mathematical Probability, Vectors, Tensors, Matrices.

Physics: Classical Field Theory, Quantum Mechanics, Solid State Physics, Nuclear Physics.

Applied Mathematics: Numerical and Graphical Analysis, Advanced Mathematics for Engineers.

#### FUNDAMENTAL ENGINEERING GROUP

\*Automatic Control

\*Elasticity

Fluids: Stability

\*Electric Networks

\*Electromagnetic Fields

Electronics

\*Fluid Dynamics

Gas Dynamics

Heat Transfer

Modulation and Noise

Nonlinear Mechanics

Plates and Shells

Plasticity

\*Structural Theory

\*Thermodynamics

\*Transients

#### ELECTIVE GROUP

This group is comprised of courses offered occasionally in such areas as digital computers, high-speed aerodynamics, jet propulsion, potential theory, structural analysis, and transients. In addition, graduate courses in areas not included in the Basic Group offered by the departments of Mathematics, Statistics, Physics, and Chemistry may be taken for degree credit with the approval of the Committee. In general, work in areas which are characterized by a scientific discipline may be accepted in satisfaction of course requirements for the degree of Master of Science in Engineering.



### THE DEGREE OF MASTER OF ENGINEERING ADMINISTRATION

Upon the satisfactory completion of the requirements of the School of Engineering the degree of Master of Engineering Administration is conferred. The purpose of this program is to offer, through advanced study at graduate level, a means of improving the management and administrative ability of government and industrial engineers and scientists.

The objective of this graduate discipline is to develop competence in management principles and practices as they apply in the administration of engineering and scientific activities. Knowledge and understanding are sought rather than breadth of familiarity with techniques.

Study programs are suggested for each candidate, in accordance with his preparation and objective, by the Committee on Graduate Studies. These programs are not curricula common to all candidates for the degree. They may consist of formal courses, independent study or self-directed study under assigned faculty, and may vary freely among departments and fields of study. Each candidate is under the personal guidance of a selected faculty member.

#### ADMISSION TO CANDIDACY

Applications for admission to candidacy for the degree must be submitted to the Office of the Director of Admissions on the form prescribed by that Office. Applicants will be advised by the Committee on Graduate Studies of the time and place of the required personal interview.

Applicants are required to satisfy the Committee at their own expense that productive study in the discipline must have acceptable personal qualities; must hold a Bachelor's degree in engineering or science from a recognized institution; must have had some supervisory or administrative experience; and give evidence of preparation which is the opinion of the Committee on Graduate Studies is adequate for graduate study.

Applicants who lack a satisfactory Bachelor's degree or whose adequacy of preparation is questioned may be admitted to candidacy upon passing qualifying examinations prescribed by the Committee. Applicants lacking satisfactory supervisory or administrative experience may, under certain circumstances, be considered by the Committee. Applicants with limited areas of unsatisfactory preparation may be required to complete necessary remedial study before being admitted to candidacy.

#### ADVANCED STANDING

Graduate study completed prior to admission to candidacy for the degree will not be transferred but credit has will be considered in prescribing the program of study, provided it contributes substantially to

the achievement of the objective of the discipline. In any case a minimum of one year full-time study must be completed under the Committee of Graduate Studies.

Study applied to satisfy the requirements for another degree may not be applied toward the degree of Master of Engineering Administration.

#### REQUIREMENTS FOR THE DEGREE

The candidate for the degree of Master of Engineering Administration must successfully complete a minimum of one year full-time study, or the equivalent in part-time study, as prescribed by the Committee on Graduate Studies, including course examinations, pass a comprehensive examination on his area of study, and solve a comprehensive problem in engineering administration. At the discretion of the Committee the examination may be written, oral, or both.

The grade of "Satisfactory" or better is required in all courses of instruction. The student with one grade of "Unsatisfactory" may repeat the course once or may appeal to the Committee for guidance. The student who receives two or more grades of "Unsatisfactory" is not permitted to enroll further in the School of Engineering. A student barred for poor scholarship may apply to the Committee on Graduate Studies for readmission, and must demonstrate to the Committee, by examination, that deficiencies in course work have been removed. No student will be permitted to take the comprehensive examination until he has received the grade of "Satisfactory" or higher in all work in his program, and has submitted an acceptable Master's problem.

The problem which each candidate is required to solve may be proposed by the student, but it must be approved by the Committee. Its purpose is to demonstrate the candidate's ability to integrate his studies in the solution of a typical administrative problem of a comprehensive nature, requiring for its solution knowledge of a variety of principles and procedures. The candidate is subject to oral examination on his problem at the discretion of the Committee.

The work for the degree, including the comprehensive examination, must be completed within three years by a full-time student, or within five years by a part-time student.

#### THE PROFESSIONAL DEGREES

The professional degree of Civil Engineer, Electrical Engineer, or Mechanical Engineer may be conferred upon a graduate of the School of Engineering who has demonstrated his professional ability.

## REQUIREMENTS FOR THE DEGREE

1. Application may not be made sooner than three years after graduation, and then only if the candidate has had definite responsibility for engineering work of substantial importance.

2. A detailed statement of the candidate's experience, references, the degree sought, and the title of the dissertation must be filed with the Dean eight months before the Commencement at which the degree is to be conferred.

Detailed information concerning the preparation of the dissertation may be obtained from the Office of the Dean.

3. The dissertation will be read for acceptance by an examining committee appointed by the Dean to include members of the Faculty of the School of Engineering and at least one expert from engineering practice. The committee will report its recommendation to the Faculty of the School of Engineering.



COURSES OF INSTRUCTION



## COURSES OF INSTRUCTION

On the following pages, under the alphabetically arranged names of the departments of instruction are listed the courses of instruction offered in the School of Engineering. Also listed are courses offered by other schools and colleges of the University, but treated or accounted as electives for the degree in engineering. The courses as here listed are subject to such slight change. Students are referred to the *Schedule of Courses*, which is available prior to the opening of each semester, for the better scheduling of all instruction.

The University reserves the right to withdraw any course announced.

### EXPLANATION OF COURSE NUMBERS

The following system of numbering is used to identify courses.

*Undergraduate courses*—Courses numbered from 1 to 100 are planned for students in the freshman and sophomore years. Courses numbered from 101 to 200 are planned for students in the junior and senior years.

*Graduate courses*—Courses numbered from 201 to 300 are planned primarily for graduate students. They are open, with the approval of the Chairman of the Committee on Graduate Studies and the Dean, to qualified seniors.

### INDICATION OF THE AMOUNT OF CREDIT

The number of semester hours given for the satisfactory completion of a course is, in most cases, indicated in parentheses after the name of the course. Thus a one-semester course giving three hours of credit each semester is marked (3-3), and a semester course giving three hours of credit is marked (3). A semester hour usually consists of the completion of one fifty-minute period of class work or of one laboratory period a week for one semester.

## ENGINEERING

### UNDERGRADUATE COURSES

#### CIVIL ENGINEERING

##### 12 Surveying (3)

Survey, lecture (4 hours), field work 11 hours (evening and Saturday).

Principles, methods, and instruments used in making level, traverse, and triangulation surveys, elements of simple surveying, traverse, and triangulation of observational errors. Prerequisite: Mathematics to Mechanical Engineering 2. Surveying for 311.



21 *Analytical Mechanics (Statics) (3)*

Fall—morning and evening; spring—morning and evening.

Free-body diagrams, equilibrium, stresses in simple frames. And topics: analysis of simple machines in tension, compression, bending, or torsion; stress and deformation; Vibration; forces, moments and moments of inertia. Prerequisite: Physics 6. Prerequisite or concurrent instruction: Mathematics 20.

24 *Strength of Materials (1)*

Fall—morning and evening; spring—morning and evening.

Development and application of reduction necessary to analyze stresses and discussion of simple machines and structural components, simple stress, strain, energy, buckling of columns and beams, design of simple machines and joints, orthogonal stresses and stress-strain curves, stress-strain and stress-strain curves of various materials. Prerequisite: Civil Engineering 11.

121 *Analytical Mechanics (Dynamics) (3)*

Fall—morning; spring—morning.

Kinematics, Kinematics, translation, rotation, and plane motion of rigid bodies; statics, energy, linear impulse, momentum, linear impulse, rotation. Prerequisite: Civil Engineering 11; Mathematics 10.

125 *Engineering Materials (4)*

Fall—morning and evening; laboratory—morning and evening.

Mechanical behavior of engineering materials including mechanical testing, elasticity, plasticity, fracture, ductility, creep, and fatigue; discussion of metallurgy and physics of metals. Prerequisite: Chemistry 10, Physics 8, Civil Engineering 14. Laboratory fee: \$10.

126 *Structures (3)*

1917-18 and alternate years: spring—morning, 1918-19 and alternate years: spring—morning.

A limited study of engineering materials including steel and cast iron and their properties as structural members, strength, plasticity, creep, stress-strain, fatigue, bearing capacity, and settlement. Study of simple structures. Prerequisite: Civil Engineering 14 and 124.

132 *Fluid Mechanics (2)*

Spring—afternoon and evening; laboratory—morning and evening.

Development of the fundamental principles of flow of liquids and ideal gases; and discussion of the fundamental principles of flow of liquids and ideal gases; and discussion of the fundamental principles of flow of liquids and ideal gases; and discussion of the fundamental principles of flow of liquids and ideal gases. Prerequisite: Civil Engineering 11; Mathematics 10. Laboratory fee: \$10.

135 *Hydraulic Engineering (5)**Fall—evening*

Applied fluid mechanics, hydrology, principles of water conservation, introduction to fluid energy, water supply, drainage and irrigation, evaluation of costs, multiple purpose projects, and general development of water resources. Prerequisite: Civil Engineering 112.

136 *Sanitary Engineering (1)**Spring—evening*

Collection, storage, purification, and distribution of water, sewerage systems and treatment of sewage. Prerequisite: Chemistry 14, Civil Engineering 112.

143-44 *Structural Theory and Analysis I/II (4/4)*

143: 48 and alternate years. Analysis, equilibrium and bending, torsion and alternate years. Analysis, post-tensioning.

Introduction to the structural behavior of statically determinate and indeterminate beams, frames, girders, and trusses and the application of their principles to their analysis; various basic analysis of simple, portal, continuous, moment, and shear systems. Structural laboratory. Prerequisite: Civil Engineering 14. Laboratory fee \$11 a semester.

145 *Steel and Timber Structures (1)*

145: 48 and alternate years. Allowable stress, 14: 48 and alternate years. Allowable stress.

Design of steel and timber buildings, bridges, and other structural members of steel and timber. Prerequisite: Civil Engineering 144.

146 *Concrete Theory and Design (4)*

146: 48 and alternate years. Allowable stress, design and concrete stress, stress-strain.

Theory and design of slab and reinforced concrete structures. Prerequisite: Civil Engineering 144.

153 *Structural Theory and Analysis III (3)*

153: 48 and alternate years. Allowable stress, 14: 48 and alternate years. Allowable stress.

Further treatment of statically indeterminate structures, introduction to plastic analysis, girders, frames, and other secondary, moment and approximate methods of analysis. Prerequisite: Civil Engineering 144. Mathematics 112.

154 *Structural Dynamics (1)*

154: 48 and alternate years. Spring—evening, 14: 48 and alternate years. Spring—afternoon.

Theory of structural vibration, vibration by and induced loading on structures. Prerequisite: Civil Engineering 142.

157 *Advanced Mechanics of Materials* (3)

Fall—day afternoon

Selected topics in mechanics of deformable bodies. Including: stresses at a point, internal forces, internal moments in the beams in straight and curved forms, torsion, stress concentration, fatigue, variations of stresses of failure, thick walls, cylindrical tanks, thermal stress, and deformation based on stress-strain. Prerequisite: Civil Engineering 111, Mathematics 114. Permission or equivalent experience: Civil Engineering 144 or Mechanical Engineering 121.

163 *Transportation Engineering* (3)

Fall—evening

Planning, location, construction, operation, and maintenance of transportation systems. Prerequisite: Civil Engineering 111.

168 *Regional and Urban Planning* (3)

Spring—evening

Introduction to regional and urban planning with emphasis on transportation for transportation systems. Prerequisite: Civil Engineering 111.

ELECTRICAL ENGINEERING

11 *Electric Circuits* (3)

Fall—evening and evening, spring—morning and evening

Current, voltage, power circuit systems, Kirchhoff's laws and derivatives, differential equations, steady-state, RLC and transient voltage, steady-state with AC and AC analysis, impedance, power, maximum power transfer, polyphase circuits. Prerequisite: Mathematics 114, Physics 2. Permission or equivalent experience: Mathematics 21.

12 *Electric Machinery* (3)

Spring—morning and evening, summer 1967

Principles of electromechanical energy conversion, methods of machine analysis, theory of d.c. and synchronous machines. Prerequisite: Electrical Engineering 11.

153 *Electric and Magnetic Fields* (3)

Spring—morning and evening

Introduction to vector analysis, basic concepts of electrostatic and magnetostatic. Analysis of uniform, cylindrical, spherical, and magnetic dipoles. Prerequisite: Electrical Engineering 11, Mathematics 114.

154 *Field Analysis* (3)

Fall—evening and evening

Scalar fields, method of images, vector potential, magnetic vector potential, differential equations, solutions of Laplace's equation, field plots.



ring, cathodes. Particle motion in electric and magnetic fields. Introduction to MAXWELL'S equations. Prerequisite: Electrical Engineering 101. Prerequisite or concurrent enrollment: Mathematics 112.

107 *Steady-state Circuit Analysis* (3)

Fall—morning and evening.

First-terminal networks, network theorems, impedance theory, coupled circuits, transmission lines, Fourier series. Prerequisite: Electrical Engineering 11, Mathematics 101.

111 *Electrical Measurements* (2)

Fall—morning and evening.

Systems of units, theory of errors, dc indicating instruments and galvanometer dynamics, position measurement of voltage and resistance, magnetic measurements. Prerequisite: Electrical Engineering 12, Mathematics 101.

112 *Electrical Measurements* (2)

Spring—morning and evening.

Theory of ac indicating instruments, measurement of power, watt-hour, ac bridge, impedance measurements. Prerequisite: Electrical Engineering 111.

113 *Electric Power Laboratory* (2)

Fall—afternoon and evening.

Experiments in ac circuits, instruments, and machines. Prerequisite: Electrical Engineering 12. Laboratory fee \$11.

114 *Electric Power Laboratory* (2)

Spring—morning and evening.

Experiments in ac circuits, instruments, and machines. Prerequisite: Electrical Engineering 111. Laboratory fee \$11.

118 *Alternating-current Machinery* (1)

Spring—morning and evening.

Generation and delivery to equilibrium machines, theory of synchronous, induction, synchronous and asynchronous machines, transient behavior and dynamics. Prerequisite: Electrical Engineering 12, 107, and 108.

121 *Communications Laboratory I* (2)

Fall—afternoon and evening.

Experiments in audio and video transmission, ac generator, bridge, amplifiers, and oscillators. Theory and use of electronic instruments. Prerequisite: Electrical Engineering 106, 107, and 111. Prerequisite or concurrent enrollment: Electrical Engineering 107. Laboratory fee \$11.

124 *Communications Laboratory II* (2)

Spring—morning and evening

Experiments at radio frequencies: impedance measurements, amplifiers, transmission lines, modulation. Experiments at microwave frequencies: antennas, waveguides, impedances, frequency, power, and standing wave measurements. Prerequisite: Electrical Engineering 112. Fee: \$10.

127 *General Network Analysis* (3)

Fall—morning and evening

Lattice reduction, Fourier integral, pass and loss of network functions, correlation of time and frequency domain methods. Prerequisite: Electrical Engineering 107, Mathematics 112.

128 *Control System Analysis* (3)

Spring—morning and evening

Transfer analysis of control systems, transfer functions and stability criteria, introduction to servomechanism design. Prerequisite: Electrical Engineering 112 and 117.

131-32 *Electric Power Systems* (2-2)

Autumn year—evening

Theory and analysis of symmetrical components, generation and distribution, system stability and protection. Prerequisite: Electrical Engineering 115.

140 *Electromagnetic Waves* (4)

Spring—morning and evening

Electromagnetic waves in free space, reflection from perfectly conducting transmission lines, waveguides and antennas. Prerequisite: Electrical Engineering 104, Mathematics 112.

137 *Electronic Circuits* (3)

Fall—morning, afternoon, and evening

Equivalent circuits of multistage amplifiers, low-pass, band-pass, feedback, and power amplifiers; oscillators, mixers and frequency modulators and detectors. Prerequisite: Electrical Engineering 104, Physics 110, Mathematics 112.

171 *Modern Computing Machines* (3)

Fall—day afternoon

Introduction to modern computing machines, basic principles, coding systems, instruction, control, programming, types of machines and principles of operation. Prerequisite: Mathematics 112.

172 *Machinist Construction Circuitry* (3)

Spring—late afternoon.

Topics: constructing mechanical circuits; machine circuitry; and mechanical operations; logic circuits and switching circuits. Prerequisite: Electrical Engineering 117 and 171.

189-92 *Principles in Electrical Engineering* (1-1)

Academic year—afternoon.

Oral and written examinations of technical papers by students, with group discussion and critical review. Prerequisite: physics course.

## MECHANICAL ENGINEERING

3-4 *Graphical Communications I-II* (2-1)

Academic year—morning, afternoon, and evening.

Special visualization and drawing, perspective, isometric drawing, sketching, descriptive geometry, descriptive geometry, descriptive geometry, descriptive geometry, descriptive geometry. Drafting—free, free, free.

5 *Orientation and Engineering Problems* (2)

Following—afternoon, and evening, spring—morning and evening.

Open to freshmen only. Orientation in school. Introduction to the new engineering field and other engineering systems of engineering. Methods of study and work. Sample problems in engineering.

6 *Engineering Problems*\* (2)

Spring—morning and evening, summer 1957.

Sample engineering problems in science, literature, history, law and society. Training in reasoning, engineering analysis, and application of mathematics to engineering problems. Prerequisite: Mechanical Engineering 1; removal of all science prerequisites in science and mathematics.

14 *Analytical Kinematics* (3)

Spring—morning and evening.

Analytical study of mechanical systems of rigid bodies and their mechanisms; complete kinematic analysis, and more. Prerequisite: Physics 6, Mechanical Engineering 4 and 5. Prerequisite in mechanical engineering: Mathematics 115.

113 *Theoretical Thermodynamics I* (1)

Following—morning and evening.

Fundamental concepts, derivation of state functions and second law of thermodynamics, entropy, heat and temperature systems. Prerequisite: Chemistry 12, Mathematics 115, Physics 8.

\* This course would be completed before the beginning of the academic year.



114 *Theoretical Thermodynamics II* (3)

1957-58 and alternate years: spring—morning and evening, 1958-59 and alternate years: spring—evening

Vapor cycles, combustion gas dynamics, equilibrium, non-equilibrium, Permeable Mechanical Engineering 113, Mathematics 114. Prerequisite: no concurrent registration; Civil Engineering 132; Mechanical Engineering 115.

116 *Heat Transfer* (3)

Spring—morning and evening.

Heat transfer theory, conduction, convection, radiation, field and potential theory applied to radiation. Lecture and laboratory. Laboratory fee \$10. Prerequisite: Mechanical Engineering 113, Mathematics 112.

120 *Physical Metallurgy* (3)

1957-58 and alternate years: spring—evening, 1958-59 and alternate years: spring—morning

Physics of metals, crystal and lattice structures, binary and ternary alloys, properties of alloys, non-equilibrium conditions, phase diagrams. Prerequisite: Mathematics 112, Civil Engineering 132.

123 *Advanced Dynamics* (4)

1957-58 and alternate years: fall—morning and evening, 1958-59 and alternate years: fall—evening

Dynamics of a particle and systems of particles, dynamics of a system with constraints, vibration, shocks, the gyroscope. Prerequisite: Mathematics 112, Civil Engineering 131, Electrical Engineering 11, Mechanical Engineering 14. Prerequisite or concurrent registration: Civil Engineering 167.

135-36 *Heat Power Engineering* (3-3)

1957-58 and alternate years: academic year—morning and evening, 1958-59 and alternate years: academic year—morning

Analysis and design, principles governing systems and components in heat power, gas and vapor turbines, internal combustion engines, fuel pumps, nuclear power systems. Lecture and laboratory. Laboratory fee \$10 a semester. Prerequisite: Physics 101, Civil Engineering 132, Mechanical Engineering 114, 115. Prerequisite or concurrent registration: Civil Engineering 167.

137 *Fluid Machinery* (3)

1957-58 and alternate years: fall—morning and evening, 1958-59 and alternate years: fall—morning

Positive-displacement machines; hydraulic circuits and non-circulatory flows; general theory of dynamic machines; velocity diagrams and work transfer; turbomachines and liquid ammonia (solid, wet) and mixed flow machines. Lecture and laboratory. Laboratory fee \$10.

Prerequisite: Civil Engineering 141, Mechanical Engineering 111, Principles of automatic regulation, Mechanical Engineering 111.

#### 143 *Productive Engineering* (4)

1977-78 and alternate years: fall—mechanics and machine tools—24 and alternate years: fall—mechanics.

Principles of production engineering, productivity, production methods, quality control, automation, production systems. Prerequisite: Mechanical Engineering 141, 111, Mathematics 111.

#### 146 *Dynamics of Incompressible Fluids* (4)

1977-78 and alternate years: spring—mechanics, tubing and alternative energy, spring—mechanics.

Mathematical theory of incompressible fluid flow, flow around immersed bodies, and/or theory of flow past tubes. Mathematical analysis of incompressible fluids. Laboratory for 5th. Prerequisite: Mechanical Engineering 111, 112.

#### 148 *Machines: Analysis and Synthesis* (4)

1977-78 and alternate years: spring—mechanics, tubing and alternative energy, spring—mechanics.

Analysis and synthesis of machine mechanisms and of complex mechanisms, analysis of machines and gears, synthesis of mechanisms. Prerequisite: Electrical Engineering 12, Mechanical Engineering 111, 112, 113, 141. Prerequisite or concurrent enrollment: Mechanical Engineering 111.

#### 152 *Instrumentation* (4)

1977-78 and alternate years: spring—mechanics, 1977-79 and alternate years: spring—mechanics.

Theory of measurement and automatic control systems, including electromechanical, pneumatic, and hydraulic systems. Lecture and laboratory. Laboratory for 5th. Prerequisite: Physics 111, Electrical Engineering 12, Mechanical Engineering 111, 112, 141. Prerequisite or concurrent enrollment: Mechanical Engineering 111.

## GRADUATE COURSES

## CIVIL ENGINEERING

251 *Theory of Structures (3)*

Spring—evening

Classical and modern methods of structural analysis; basic theory of structures; statically indeterminate structures, including continuous beams and frames, cables, and suspension bridges; two-level analysis; special problems. Prerequisite: Civil Engineering 451, Mathematics 401.

255 *Theory of Elastic Stability (3)*

Spring—evening

Buckling problems and methods of analysis (including numerical methods); lateral buckling of beams; buckling of steel beams, the plate; column deflection; and finally, the case of buckling of arches. Prerequisite: Engineering 451.

## ELECTRICAL ENGINEERING

203 *Operational Analysis of Linear Systems (3)*

Fall—evening

Transient analysis of linear, lumped-parameter electrical and mechanical systems by operational methods with emphasis on Laplace transform.

205 *Electronic Circuit Analysis (3)*

Fall—evening

Methods of linear and nonlinear circuit analysis to vacuum and active networks including vacuum tube and transistor circuits, and diode and diode-triac amplifiers.

207 *Steady-State Network Analysis (3)*

Spring—evening

Analysis of lumped, linear networks; sinusoidal, pass and active analysis; network theorems; two-terminal networks; short circuit theorems; network functions; and general network properties.

209 *Electromagnetic Field Analysis (3)*

Spring—evening

Electrostatic, magnetostatic, and Maxwell's equations; solutions of Laplace's equation; retarded potentials; electromagnetic waves in bounded media; and antenna radiation.

211 *Physical Electronics (3)*

Spring—evening

Thermionic emission, charged particle motion in vacuum, and other



otic fields, physical analysis of diodes and triodes, space charge and potential distributions, electron optics, electronic principles of microwave tubes.

215 *Analysis of Modulation and Noise* (3)

Spring—summer

Analysis by Fourier series and integrals of signals and linear networks, modulation and spectra, noise analysis including probability method of determining power spectra.

231 *Basic Concepts of Digital Computers* (3)

Not offered 1957-58

Historical survey of computers, arithmetic systems, computers, logic, basic elements of digital computers, selected topics in algorithms, information theory, and logic.

### ENGINEERING ADMINISTRATION

The School of Engineering offers the following courses primarily for candidates for the degree of Master of Engineering Administration. Other courses listed in this program are offered by the departments of Accounting, Business and Public Administration, Geography, Psychology, Speech, and Statistics.

191 *Engineering Law*\* (3)

Fall—summer

The influence of contract, property, and tort law upon engineering activities. Covers legal principles relating to the organization and management of engineering companies and governmental departments, and legal questions of interest to engineers. Specific topics considered include contracts, agency, partnerships, corporations, loans, and patent litigation.

201 *Engineering Administration I* (3)

Fall—winter; spring—summer

The principles and practice of administration of engineering and related activities, including organization, planning, management, and function, responsibility, (policy) and the application and use of scientific method in administration. Case study is emphasized.

202 *Engineering Administration II* (1)

Fall—winter; spring—summer

Continuation of Engineering Administration I, covering: strategy, financial administration, control, budgeting, audit, and motivation. Emphasis on human behavior and administrative personnel and related

\* A. An administrator must be student Engineer for previous work in Engineering Administration.

with particular reference to approval and acceptability. Case study is widely employed.

205 *Engineer and Society* (3)

Spring—evening

Role of the engineer and the engineering profession in society; the influence of legislation in engineering and scientific activities; and the relationship of engineering to the community, state, nation, and the world. Case studies by the student are required.

211 *Commercialization of Ideas I* (3)

Fall—evening

The purpose of this course is to increase skills and abilities in written communication, including technical reports, administrative correspondence, articles for publication, and other material pertaining to technical and commercial problems. The principles and purposes of formal technical communication; the relative effectiveness of graphic tables, flowcharts, diagrams, and other pictorial visual design; memoranda; and the functional nature of technical communication; such as the selection of words, presentation of material in terms of different organization and explication, and selection of language; the form to the need of the technical application.

212 *Methods and Materials of Professional Communication* (3)

Spring—evening

Effective use of symbols in the communication of professional ideas among engineering, industry, and engineering community organizations.

251 *Management of Research and Development* (3)

Fall—evening

Management problems involved in the administration of research and development programs, including understanding of technical and scientific data in programming, selection of organizations for research, development, research, evaluation, period, and evaluation of product. Principles of Engineering Administration and use, in terms of research.

252 *Production and Maintenance Management* (3)

Spring—evening

The managerial implications of the rapid industrial revolution toward automation. Sources of skills and abilities essential to successful management, including maintenance of equipment and tooling, the relationship between the philosophy of general industrial management and the policies and programs of automation and production. Principles of Engineering Administration and use, in terms of production.

261 *Economic Analysis in Engineering Planning* (3)

Fall—evening

The application of economic principles to engineering administrative issues, projects, investments, and plans. Studies use much of the methods of analyzing economic factors in evaluating alternate courses of administrative action in government and industry.

271 *Operations Research* (3)

Fall—evening

Survey of operations research including: objectives, history, applications of a quantitative review of basic probability theory with emphasis on application and statistical techniques (such as queuing theory, finite programming, information theory, game theory, etc.) solution of other problems; case studies and discussion of operations research concepts.

272 *Operations Research (Field Work)* (3)

Spring—evening

Guided field work in operations research on industrial and other operations. Includes a solution of the operations to be studied and the formulation and solution of problems. Prerequisite: Engineering Administration 271 or consent of instructor.

276 *Problems in Engineering Administration* (1)

Fall—evening; spring—evening

The application of scientific methods to the solution of administrative problems in engineering administration. An administrative problem selected by the student and approved by the instructor tentatively involving a variety of the theories, principles and disciplines applied in the course of the Master of Engineering Administration, is stated and the solution developed. This course is taken within the last two semesters of the Master's program.

## GENERAL ENGINEERING

The following courses are of basic interest in various specialties in engineering.

211 *Analysis of Engineering Systems* (3)

Fall—evening

Application of fundamental engineering principles and qualitative thought to the formulation and solution of current engineering problems of physical systems in the fields of civil, electrical, and mechanical engineering; analysis of systems and structures. Emphasis is placed on analytical and approximate numerical methods of solving problems of partial differential equations and boundary value problems as illustrated for some structural systems analysis. Prerequisite: Graduate course in engineering or physics; Mathematics 101. Permission of instructor required. Mathematics 102.



212 *Mathematics Applied to Engineering Systems* (3)

Spring—evening.

Rigorous analytical and approximate numerical and graphical methods of solution applied to engineering systems. Prerequisite: Equivalent to 211.

217 *Analytical Mechanics* (3)

Fall—evening.

Fundamental principles, generalized coordinates, variational principles and Lagrange's equations, mechanical systems, Hamilton's equations, theory of small oscillations.

221 *Theory of Elasticity* (3)

Fall—evening.

Stress and strain at a point, differential equations of equilibrium, boundary conditions, compatibility conditions, and stress functions, two-dimensional problems in plane and polar coordinates, stress energy, including elementary three-dimensional problems, problems involving stress intensity factors, thermal stress. Prerequisite: Civil Engineering 144 or Mechanical Engineering 125, Mathematics 112.

224 *Plates and Shells* (3)

Spring—evening.

Plane bending of flat plates, laterally loaded flat plates, the membrane plate with various edge conditions, bending of flat plates under combined lateral and membrane loads, curved shells.

226 *Plasticity of Solids* (3)

Spring—evening.

Plastic flow and fracture of solids; theory of perfectly plastic solids including hardening; plastic deformation of simple, tension and compression, and plane stress problems; theory of fracture. Prerequisite: Engineering 121.

231 *Advanced Fluid Dynamics* (3)

Spring—evening.

Theory of compressible and incompressible fluid motion including potential motion, circulation and vorticity, irrotational motion, flow at sub, trans, and supersonic velocities, shocks and oblique shocks, and theories of heat transfer. Prerequisite: Civil Engineering 142.

## MECHANICAL ENGINEERING

201 *Automatic Control* (3)

Fall—evening.

Theory of measurement and control systems including Laplace

to equations, transfer functions, system analysis, dynamic analysis, multiphase systems, and nonlinearities.

211 *Thermodynamics and Statistical Mechanics (3)*

Full—as arranged, spring—as arranged.

Reversible and irreversible processes, equilibrium ideal and van der Waals gases, other solutions, phase equilibria, entropy and magnetic effects, radiation. Introduction to kinetic theory and non-equilibrium statistical mechanics.

213 *Advanced Heat Transfer (4)*

Spring—as arranged.

Physical and mathematical treatment of heat transfer phenomena, steady state and transient problems, including: radiation, convection, and phase change phenomena. Fourier heat equation for conduction, differential analysis and boundary layer theory for convection.

215 *Gas Dynamics (3)*

Spring—as arranged.

Theory of gas dynamics including: compressible shock phenomena, dynamics of flow, and heat transfer for heat recuperating systems.

220 *Nonlinear Mechanics (3)*

Spring—optional.

Linear and nonlinear problems in mechanics, nonlinear systems, resonance, nonlinear oscillations.

233 *Supersonic Flow and Shock Waves (3)*

Spring—as arranged.

Theory of supersonic, compressible fluid flow in steady and unsteady conditions, shock waves and their effects on flow and objects, supersonic flow around slender bodies, theory of interaction and shock three-dimensional wave theory, flow over.

## REQUIRED AND ELECTIVE COURSES FROM OTHER DEPARTMENTS

On the following pages appears a partial list of courses in other departments of instruction which are closely related to engineering. Some of these courses are prescribed in the several curricula of the School of Engineering, all are recommended as suitable elective subjects for engineering students.

### ACCOUNTING

- 1-2 *Introductory Accounting* (3-3)  
Basic principles and procedures in keeping accounting records, preparation of work sheets and financial statements; introduction to cost accounting and valuation, and income determination processes.
- 101 *Cost Accounting* (3)  
Theory and practice of industrial cost accounting; systems of cost control and determination, analysis and interpretation of cost data.
- 111 *Financial Statement Analysis* (3)  
Methods and techniques of analyzing, auditing, and interpreting financial statements. Determination and interpretation of trends and ratios.
- 103 *Business Budgeting* (3)  
Principles, preparation, and administration of a business budget.
- 211-12 *Managerial Accounting* (3-3)
- 203 *Budget Preparation and Control* (3)  
Principles, techniques, and procedures involved in the development, formulation, and operation of a system of budgetary control as aid in the management of commercial, industrial, and governmental organizations. *Principles of Accounting* 418.

### AIR SCIENCE

- 1-2 *Leadership Laboratory—Freshman Year* (1-1)
- 11-12 *Leadership Laboratory—Sophomore Year* (1-1)
- 21-22 *Air Science I—Freshman Year* (2-2)
- 31-32 *Air Science II—Sophomore Year* (2-2)
- 101-2 *Air Science III—Junior Year* (3-3)
- 151-52 *Air Science IV—Senior Year* (3-3)

### BUSINESS AND PUBLIC ADMINISTRATION

#### BUSINESS ADMINISTRATION

- 101 *Business Organization and Combination* (3)  
Scope and interrelated forms of business enterprise and their control by government.



- 105 *Personnel Management in Industry* (3)  
Organization and work of the personnel department, human relations in business.
- 106 *Problems in Personnel Management* (3)  
Illustrated by cases drawn from business and industry.
- 107 *Office Management* (3)  
Organization and layout of an office, use of office machine and appliances, planning and execution of work, interview position.
- 111 *General Insurance* (3)  
Principles of property, life, marine, and casualty insurance, the function of insurance in the economic life of a business and individual.
- 113 *Business Finance* (3)  
Principles of financing business enterprises. Procedures. Accounting 1-2.
- 141 *Principles of Marketing* (3)  
Survey of marketing, involving consumption, retailing, wholesaling and sales management, market research, structure and its relation to the total economy.
- 145 *Sales Management* (3)  
Description of sales department, sales planning and forecasting, quotas, territories, performance standards, analysis and control of marketing costs. Procedures. Business Administration 141.
- 150 *Principles of Purchasing* (3)  
Organization for purchasing, purchasing policies, market relationships, selection of merchandise, purchasing administration and records.
- 161 *Commercial Law: Contracts, Sales, Agency, and Bailments* (3)
- 213 *Administration in Government* (1)
- 250 *Contract Administration* (3)

## CHEMISTRY

- 11-12 *General Chemistry* (4-4)  
Prerequisite: one year of high school science. Laboratory fee, \$18 a semester. Lecture, laboratory, and museum. This is a 3-semester course. Credit is not given for the first half until the second half is completed.
- 21 *Qualitative Inorganic Analysis* (4)  
Prerequisite: Chemistry 12. Laboratory fee, \$18. Lecture and laboratory.
- 22 *Quantitative Inorganic Analysis I* (4)  
Prerequisite: Chemistry 21. Laboratory fee, \$18. Lecture and laboratory.
- 111-12 *Physical Chemistry Lectures* (3-3)  
Students registering for Chemistry 111-12 must register concurrently for Chemistry 111-14 unless they already have credit for physical

chemistry laboratory. This is a full-year course. Credit is not given for the first half until the second half is completed. Prerequisite: Chemistry 22 and 152; Mathematics 22; Physics 8.

113-14 *Physical Chemistry Laboratory* (2-2)

Laboratory to accompany Chemistry 111-12. Students registering for Chemistry 113-14 must register concurrently for Chemistry 111-12 unless they already have credit for lectures in physical chemistry. This is a full-year course. Credit is not given for the first half until the second half is completed. Laboratory fee, \$18 a semester.

122 *Quantitative Inorganic Analysis II* (4)

A continuation of Chemistry 22. Prerequisite: Chemistry 22. Laboratory fee, \$18. Lecture and laboratory.

135 *Inorganic Chemistry: Preparations* (2)

Prerequisite: Chemistry 152; permission or concurrent registration: Chemistry 111-12 and 113-14. Laboratory fee, \$18.

151-52 *Organic Chemistry* (4-4)

Chemistry of the carbon compounds. Prerequisite: Chemistry 22. This is a full-year course. Credit is not given for the first half until the second half is completed. Chemistry 151 laboratory fee, \$11; Chemistry 152 laboratory fee, \$18. Lecture and laboratory.

155 *Organic Chemistry: Preparations* (2 or 3)

The synthesis of organic compounds and the application of the techniques of organic chemistry to the preparation of pure compounds, using larger amounts and greater temperatures than in Chemistry 135-36. Prerequisite: Chemistry 22 and 142. Laboratory fee, \$18-21 a semester fee.

ECONOMICS\*

1-2 *Principles of Economics* (1-3)

Survey of the major economic principles, institutions, and problems in contemporary economic life. Economics 1 is prerequisite to Economics 2.

101-2 *Economic Analysis* (3-3)

Analysis of demand, supply, and commodity pricing; theory of national income determination; pricing of productive services; welfare economics. Economics 101 is prerequisite to Economics 102.

105 *Business Cycles* (3)

Analysis of strategies current in business cycles; survey of recent business cycle theories.

121 *Money and Banking* (3)

Theory of money, credit, and banking; commercial banking and the Federal Reserve System; other financial institutions; international aspects of money; current financial problems.

141 *Industrial Relations* (3)

Development and practice of collective bargaining in America; the theory. Public control of industrial relations.

\* Economics 1-14 is approved as all work toward a Bachelor's degree.

142 *Labor Economics* (3)

Wages, hours, and employment; labor organizations; labor legislation and federal administrative boards.

## ENGLISH

1 *English Composition*\* (3)

Review of grammar, exercises in composition, readings.

2 *English Composition*\* (3)

Exercises in composition, readings. The second semester of the six-semester English Composition course required of all students.

11 *The Writing of Reports* (3)

Theory and practice in the writing of technical reports. Prerequisite: English 1, 2.

## GEOGRAPHY

271 *Engineering Geography* (3)

Selection, synthesis, and application of cultural, physical, political, economic, and social characteristics as they relate to the planning, construction, and operation of engineering works in both the United States and foreign countries, illustrated by reference to a limited number of regions and problems through case study.

## MATHEMATICS

3 *College Algebra* (3)

Prerequisite: one year each of high school algebra and high school geometry.

6 *Plane Trigonometry* (3)

Prerequisite: two years of high school algebra and one year of high school geometry or Mathematics 3 (or concurrent registration therein).

12 *Analytic Geometry* (3)

Prerequisite: Mathematics 3 and 6, or two years of high school algebra, one year of high school geometry, and one-half year of high school trigonometry.

19 *Differential Calculus* (3)

Prerequisite: Mathematics 12.

20 *Integral Calculus* (3)

Prerequisite: Mathematics 19.

122 *Fundamental Concepts of Mathematics*† (3)

\* Unless otherwise indicated, English 1, 2, 11, and 12 are listed as the minimum essentials of the English program. Students who are deficient in any of these courses may be assigned to English 1, 2, 11, or 12 as a condition of admission. Students who are deficient in any of these courses may be assigned to English 1, 2, 11, or 12 as a condition of admission. Students who are deficient in any of these courses may be assigned to English 1, 2, 11, or 12 as a condition of admission.



- 103 *Calculus and Differential Equations*\* (3)
- 112 *Mathematics for Engineers and Scientists* (3)  
Topics from advanced calculus, partial differential equations, vector analysis, and complex variables. Prerequisite: Mathematics 132 or 103.
- 123 *Theory of Equations*\* (3)
- 125 *Advanced Algebra*\* (3)
- 126 *Advanced Analytic Geometry*\* (3)
- 132 *Differential Equations*\* (3)
- 134 *Introduction to Boundary Value Problems* (3)  
Prerequisite: Mathematics 103 or 132.
- 135-36 *Projective Geometry*\* (2-2)  
A year course (1 credit is not given for the first half until the second half is completed).
- 139 *Advanced Calculus*\* (3)
- 140 *Introduction to Analysis*\* (3)
- 141 *Introduction to Infinite Series*\* (3)
- 167 *Fourier Series and Spherical Harmonics* (3)  
Prerequisite: Mathematics 132 or 134.
- 205-66 *Modern Algebra* (3-3)

## PHYSICAL EDUCATION

- 1-2 *Freshman Physical Education* (1-1)  
Locker and towel fee, \$4.00.
- 11-12 *Sophomore Physical Education* (1-1)  
Locker and towel fee, \$4.00.

## PHYSICS

- 5 *General Physics* (3)  
Light, heat, sound, energy, and the properties of matter. Prerequisite: high school physics and plane geometry. Material fee, \$11. Lecture, laboratory, and recitation.
- 6 *General Physics* (3)  
Mechanics, wave-motion, and sound. Prerequisite: Physics 5. High school physics and plane geometry. Material fee, \$11. Lecture, laboratory, and recitation.

\* Prerequisite: Mathematics 103.

7 *General Physics* (3)

Elementary electricity and magnetism. Prerequisite: Physics 5; high school algebra and plane geometry. Material fee, \$11. Lecture, laboratory, and recitation.

8 *General Physics* (3)

This course is the fourth in the sequence of courses 5, 6, 7, and 8, and emphasizes the connection between the fundamental principles studied in courses 5, 6, and 7, and the phenomena and theories of modern physics. Topics considered include electromagnetic waves (light, radio, and X-ray), atomic and molecular structure, radioactivity, nuclear physics, the quantum theory of matter and radiation, and the elementary particles such as electrons, protons, neutrons, and mesons. Prerequisite: Physics 6 and 7.

55 *Physical Measurements* (3)

Theory and methods of precise measurement. Prerequisite: Physics 6 and 7; Mathematics 10. Material fee, \$11. Lecture and laboratory.

101 *Mechanics* (3)

Statics, elasticity, dynamics of solids and fluids, and gravitation. Prerequisite: Physics 6; Mathematics 20.

102 *Heat and Thermodynamics* (3)

Fundamental concepts, heat transfer, the laws of thermodynamics and applications to physical systems. Prerequisite: Physics 8; Mathematics 20.

105 *Principles of Electricity* (3)

Elementary dc and ac circuit theory, electric and magnetic fields. Electric and magnetic materials, motion of charged particles in electric and magnetic fields. Prerequisite: Physics 6; Mathematics 20.

106 *Optics* (3)

Geometrical optics, elementary theory of wave motion, interference, diffraction, polarization, and dispersion of light; law of black-body radiation. Prerequisite: Physics 8; Mathematics 20.

111 *Atomic Physics* (3)

Properties of elementary particles, interactions with radiation, atomic spectrum, orbital and N-pyr quanta, introduction to wave mechanics. Prerequisite: Physics 8; Mathematics 20.

114 *Statistical Physics* (3)

Classical and quantum statistics with emphasis on Maxwell-Boltzmann statistics, applications to kinetic theory of gases, quantum diffusion, specific heats of gases and solids. Prerequisite: Physics 8; Mathematics 20.

118 *Introduction to Solid State Physics* (3)

Electricity and magnetic properties of solids, electron theory of metals, semiconductors, dielectrics, and piezoelectricity. Prerequisite: Physics 111; Mathematics 20.

123 *Nuclear Physics* (3)

Structure and stability of atomic nuclei, nuclear transformations and reactions, radiation of nuclei, fission. Prerequisite: Physics 111.

128 *Sound* (3)

Production, propagation, and detection of sound waves; vibrations of sounding bodies, acoustic instruments and acoustic measurements. Prerequisite: Physics 8; Mathematics 20.

132 *Electronics* (3)

The phenomena of electron motion, from which the physical properties of electron tubes and the principles underlying their basic applications. Prerequisite: Physics 8 and 55, and a course in d.c. and a.c. circuits in Physics or Engineering. Material fee, \$11.

138 *Transient Principles and Circuits* (3)

Qualitative description of transient action, introduction to transient circuit analysis, low frequency circuits, power amplifiers, high frequency oscillators, vacuum tubes and intermediate frequency amplified design, filter and network analysis. Prerequisite: Physics 132 or the equivalent.

141 *Electromagnetic Waves* (3)

Electromagnetic theory for light and radio waves, including an introduction to guided waves and cavity resonators. Prerequisite: Physics 105 and Mathematics 112 or the equivalent.

153 *Laboratory in Atomic Physics* (3)

Prerequisite: Physics 8, 55. Material fee, \$11.

155 *Advanced Laboratory in Electricity and Magnetism* (5)

Prerequisite: Physics 55, 105. Material fee, \$11.

156 *Advanced Laboratory in Optics* (5)

Prerequisite: Physics 55, 106. Material fee, \$11.

191 *Nuclear Reactors* (3)

Neutron physics, motion of neutrons, neutron reactions, slowing down and diffusion, introduction to transport theory, fission process, reactor types, basic theory of homogeneous and heterogeneous reactors including specific numerical studies from recent publications. Prerequisite: Physics 8; Mathematics 20.

## POLITICAL SCIENCE

1 *Introduction to Government* (3)9-10 *Government of the United States* (3-3)

## PSYCHOLOGY

145 *Principles of Human Relations* (3)

Survey of the psychological principles involved in dealing with individuals and groups.

146 *Problems in Human Relations* (1)



## SPEECH

1 *Effective Speaking* (3)

## STATISTICS

91-92 *Principles of Statistical Methods* (3-3)

A year course. Credit is not given for the first half until the second half is completed. Prerequisite: one semester unit in algebra. Laboratory fee, \$5 a semester. Lecture and laboratory.

111 *Business and Economic Statistics I* (3)

Characteristic values, measures of variability, sampling processes, sampling distributions, and simple correlation. Admission by permission of the instructor.

112 *Business and Economic Statistics II* (3)

Multiple and partial correlation, time series analysis, index numbers, business cycles, demand functions, and depreciation schedules. Prerequisite: Statistics 111 or the equivalent.

117 *Analysis of Variance I* (3)

Prerequisite: Statistics 91-92.

118 *Correlation and the Chi-square Test I* (3)

Prerequisite: Statistics 91-92.

155-56 *Mathematical Probability* (3-3)

A year course. Credit is not given for the first half until the second half is completed. Prerequisite: Mathematics 402 and Statistics 91-92.

157-58 *Mathematical Statistics* (3-3)

A year course. Credit is not given for the first half until the second half is completed. Prerequisite or concurrent registration: Statistics 155-56.

202 *Managerial Statistics, Standardization, and Quality Control* (3)

Fundamentals, methods of analysis of general business conditions, forecasting, statistical control techniques in management, principles, applications, and utility of standardization, acceptance sampling, various types of control charts, concepts of quality control as an industrial and administrative achievement.

## ALUMNI AND ALLIED ASSOCIATIONS

### THE GENERAL ALUMNI ASSOCIATION

The objects of this Association are to unite the graduates in closer sympathy and to promote the general welfare of the University. The following persons are eligible for *active* membership: graduates of any college, school, or division of the University; holders of honorary degrees from the University; and members of the Board of Trustees and of the Faculty of the University. Any person who has matriculated, who has been in regular attendance for one year, and who has left the University in good standing, is eligible for *associate* membership.

The Office of Alumni Relations is situated at 708 Twenty-second Street, Washington 7, D. C. Alumni are urged to keep the office informed of changes of address or occupation and to supply information with regard to their fellow alumni.

### THE ENGINEER ALUMNI ASSOCIATION OF THE GEORGE WASHINGTON UNIVERSITY

The Engineer Alumni Association was organized in 1936 and has been affiliated with the General Alumni Association since that time. Its objects are to unite the graduates and Faculty of the School of Engineering in closer fellowship, to promote the general welfare of the School of Engineering and of the University at large, to foster activities of the engineering organizations recognized by the University, and to advance the profession of engineering in general.

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14	15	16	17	18	19	20							12	13	14	15	16	17	18	19	20	21	
21	22	23	24	25	26	27							19	20	21	22	23	24	25	26	27	28	
28	29	30	31										26	27	28	29	30	31					
August								February								August							
					1	2	3							1								1	2
4	5	6	7	8	9	10							2	3	4	5	6	7	8		3	4	5
11	12	13	14	15	16	17							9	10	11	12	13	14	15		10	11	12
18	19	20	21	22	23	24							16	17	18	19	20	21	22		17	18	19
25	26	27	28	29	30	31							23	24	25	26	27	28	29		24	25	26
September								March								September							
1	2	3	4	5	6	7									1			1	2	3	4	5	6
8	9	10	11	12	13	14							7	8	9	10	11	12	13		7	8	9
15	16	17	18	19	20	21							14	15	16	17	18	19	20		14	15	16
22	23	24	25	26	27	28							21	22	23	24	25	26	27		21	22	23
29	30												28	29	30	31					28	29	30
October								April								October							
		1	2	3	4	5	6				1	2	3	4	5				1	2	3	4	5
8	9	10	11	12	13	14					6	7	8	9	10	11	12		6	7	8	9	10
15	16	17	18	19	20	21					13	14	15	16	17	18	19		13	14	15	16	17
22	23	24	25	26	27	28					20	21	22	23	24	25	26		20	21	22	23	24
29	30	31									27	28	29	30					27	28	29	30	31
November								May								November							
1	2	3	4	5	6	7									1			1	2	3	4	5	6
8	9	10	11	12	13	14							7	8	9	10	11	12		7	8	9	10
15	16	17	18	19	20	21							14	15	16	17	18	19		14	15	16	17
22	23	24	25	26	27	28							21	22	23	24	25	26		21	22	23	24
29	30												28	29	30	31				28	29	30	31
December								June								December							
1	2	3	4	5	6	7									1			1	2	3	4	5	6
8	9	10	11	12	13	14							7	8	9	10	11	12		7	8	9	10
15	16	17	18	19	20	21							14	15	16	17	18	19		14	15	16	17
22	23	24	25	26	27	28							21	22	23	24	25	26		21	22	23	24
29	30	31											28	29	30	31				28	29	30	31

# CALENDAR OF THE SCHOOL OF EDUCATION 1957-58

Date	Day	Events
1957 Fall Semester Sept. 3-11	Thursday through Friday	Prescribing for all entering students
Sept. 12	Thursday	Orientation assembly for all new students
Sept. 13 and 16	Friday and Monday	Counseling assembly for all new students*
Sept. 19-21	Thursday through Saturday morning	Registration
Sept. 23	Monday	Academic year begins
Oct. 4	Friday	Drop-out day of February Master's candidates due
Oct. 11	Friday	Dissertation subjects of June Doctoral candidates due
Oct. 19	Saturday	Fall Commencement
Oct. 25	Friday	Installation of Arts activities plans
Nov. 1	Friday	Meeting of Committee on Graduate Studies
Nov. 2	Saturday	Applications for Doctoral November comprehensive examinations due
Nov. 11	Monday	Veterans Day, Holiday
Nov. 16	Saturday	Comprehensive examinations for William graduates
Nov. 28-30	Thursday through Saturday	Thanksgiving recess
Nov. 30	Saturday	Applications for Doctoral and Master's January dissertation examinations due
Dec. 23-Jan. 4	Monday through Saturday	Christmas recess
1958 Jan. 6	Monday	Class reunion Thesis of Master's candidates due Dissertation of February Doctoral candidates due
Jan. 11	Saturday	Comprehensive examinations for Doctoral and Master's candidates

\* All new students are required to attend one Orientation Assembly.



## CALENDAR OF THE SCHOOL OF EDUCATION—Continued

Date	Day	Occasion
Jan. 15	Wednesday	Last day of classes for the fall semester
Jan. 17	Friday	Meeting of Committee on Graduate Studies
Jan. 20-28	Monday through Tuesday	Examination period
Spring Semester		
Jan. 30-Feb. 1	Thursday through Saturday morning	Registration
Feb. 3	Monday	Classes resume for the spring semester
Feb. 14	Friday	Thesis subjects for June Master's examination due
Feb. 22	Sunday	Women Convention, Home
March 3	Monday	Admission plans due from candidates of Arts graduate courses of the School of Education in February
March 8	Saturday	Dissertation subjects of graduate students submitted due
April 4-6	Friday through Wednesday	Examinations for Doctoral and Master's Arts examinations
April 10	Thursday	Dissertation subjects for February 1934 Doctoral candidates due
April 11	Friday	Comprehensive examinations for Doctoral and Master's candidates
April 26	Sunday	Meeting of Committee on Graduate Studies
May 2	Friday	Last day of classes for the spring semester
May 14	Wednesday	Examination period
May 19-27	Monday through Sunday	Registration
June 1	Wednesday	Commencement
Summer Sessions		
June 9	Monday	Registration and first day of classes of the five-week and twelve-week sessions
June 10	Monday	Registration for the eight-week session
June 17	Tuesday	Classes begin for the eight-week session
June 27	Friday	Registration ends
June 30	Monday	Registration and the last day of classes of the six-week session

CALENDAR OF THE SCHOOL OF EDUCATION—Continued

Date	Day	Occasion
July 4	Friday	Independence Day—Holiday
July 11	Friday	Applications for Doctoral and Master's July comprehensive examinations due
July 16	Wednesday	Meeting of Committee on Graduate Studies
July 21	Monday	Registration and first day of classes of second half of six-week and twelve-week sessions
July 24	Wednesday	Comprehensive examinations for Doctoral and Master's candidates
Aug. 8	Friday	Eight-week term and six-week session end Thurs. of October Master's candidates due
Aug. 11	Monday	Registration and first day of classes of the post-session
Aug. 15	Friday	Dispositions of October Doctoral candidates due
Aug. 29	Friday	Post-session ends
Sept. 18 and 19	Thursday and Friday	Registration for the fall semester of the academic year 1958-59





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## THE SCHOOL OF EDUCATION

### THE FACULTY AND STAFF OF INSTRUCTION •

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 Blake Smith Root, A.M., Ed.D., *Assistant Dean of the School of Education*

Ruth Harriet Atwell, A.M., *Professor of Physical Education for Women*

\*Mitchell Dreese, Ph.D., *Professor of Educational Psychology*

James Harold Fox, A.M., Ed.D., *Professor of Education*

Thelma Hunt, Ph.D., M.D., *Professor of Psychology*

Frances Kirkpatrick, A.M., *Professor of Home Economics*

William Henry Myers, A.M., *Professor of Physical Education for Men*

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Chester Elwood Leese, Ph.D., *Fry Professor of Physiology*

Helen Bennett Lawrence, A.M., *Professor of Physical Education for Women*

Blake Smith Root, A.M., Ed.D., *Professor of Education*

†Ralph Windsor Ruffner, A.M., Ed.D., *Professor of Education*

Joseph Henry Krupa, M.S., Ed.D., *Professor of Physical Education for Men*

Calvin Weir Pettit, Ph.D., *Professor of Speech*

Kathryn Mildred Towne, A.M., *Professor of Home Economics*

Elizabeth Burrage, A.M., *Professor of Physical Education for Women*

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Madaline Kinter Remmlein, Ph.D., J.D., *Professorial Lecturer in Education*

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Florence Mary Lumsden, A.M., Ed.D., *Professorial Lecturer in Education*

William Samuel Rumbough, A.M., Ed.D., *Professorial Lecturer in Education*

• The President of the University, the Dean of Faculties of the University, the Dean of the School, the Registrar of the University, the Director of Admissions of the University, Professors, Assistant Professors, Associate Professors, Assistant Professors, and Instructors comprise the Faculty.

† On leave of absence fall semester 1927-28.

‡ On leave of absence 1927-28.



- Howard Odum Johnson, A.M., Ed.D., *Professorial Lecturer in Education*  
 Jackson Monte Anderson, Ph.D., *Professorial Lecturer in Physical Education*  
 Homer Hadley Kempter, A.M., Ed.D., *Professorial Lecturer in Education*  
 Anthony Marinaccio, Ed.B., Ph.D., *Professorial Lecturer in Education*  
 Don Carlos Faith, Ph.D., *Associate Professor of Educational Psychology*  
 Raymond George Hooker, B.S. in P.E., A.M. in Ed., *Associate Professor of Physical Education for Men*  
 Mildred Hollander Short, A.M., *Associate Professor of Sociological Studies*  
 Anthony Charles LaBue, B.S., Ed.D., *Associate Professor of Education*  
 Vincent James DeAngelis, B.S. in P.E., A.M. in Ed., *Associate Professor of Physical Education for Men*  
 Grover LaMarr Angel, A.M., Ed.D., *Associate Professor of Education*  
 Mary Ellen Coleman, A.M., *Assistant Professor of Education, Director of the Reading Clinic*  
 Eva Mayne Johnson, A.M., *Assistant Professor of Psychology*  
 Carol Ruth St. Cyr, Ph.D., *Assistant Professor of Education*  
 William Andrew McCauley, Ph.D., *Assistant Professor of Education*  
 Harry Grubb Detwiler, A.M., *Assistant Professor of Education*  
 Louella May Stallings, A.M., *Assistant Professor of Physical Education for Women*  
 Camille Jacob Craig, B.S. in P.E., A.M. in Ed., *Assistant Professor of Physical Education for Women*  
 LaVerne Crabtree Walker, A.M., *Lecturer in Education*  
 Raymond Ray Reed, A.M., *Lecturer in Education*  
 Eugenia Campbell Neeley, A.M., *Lecturer in Education*  
 Edwin Bartow Hangan, B.S., Ed.D., *Lecturer in Education*  
 Frederick Anderson Inghart, A.M., Ed.D., *Lecturer in Education*  
 Beverly Anderson Crump, B.S., Ed.M., *Lecturer in Education*

## CONSULTANTS IN RESEARCH

- Wesley Earl Armstrong, M.S., Ed.D., *Chief for Teacher Education, U. S. Office of Education*  
 John Robert Lindgren, Ph.D., *Specialist in Individual Arts, U. S. Office of Education*  
 Francis James Brier, Ph.D., *Staff Associate, American Council on Education*

## FIELD STUDIES

- Robert Whittington Eller, A.M., *Director of Field Studies*

Field Service Coordinators

- Alexander Anderson, A.M., *Assistant Principal, Washington-Lee High School, Arlington, Virginia*  
 Mary Loust Marc, A.M., *Assistant Principal and Dean of Girls, Wakefield Junior-Senior High School, Arlington, Virginia*  
 Claude Manby Richmond, B.S., A.M. in Ed., *Principal, Stratford Junior High School, Arlington, Virginia*

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1958

- Helen Bennett Lawtonne  
 Kathryn Mildred Towne

1959

- Calvin Weir Pettit  
 Anthony Charles LaBar

1960

- Elizabeth Bartner  
 Vincent James DeAngelis

COMMITTEE ON GRADUATE STUDIES

The Dean of the School, *Chairman*

- |                         |                       |
|-------------------------|-----------------------|
| Mitchell Dreese         | Thelma Hunt           |
| Burnice Herman Jarman   | Don Carlos Faith      |
| Blake Smith Root        | Anthony Charles LaBar |
| Grover LaMar Angel      | Carol Ruth St. Cyr    |
| William Andrew McCauley |                       |

COMMITTEE ON ADMISSION AND ADVANCED STANDING

The Dean of the School, *Chairman*

- |                     |                        |
|---------------------|------------------------|
| Ruth Harriet Atwell | Harold Griffith Sutton |
| Frances Kirkpatrick | Burnice Herman Jarman  |
| Joseph Henry Krupa  |                        |

COMMITTEE ON SCHOLARSHIP

Blake Smith Root, *Chairman*

- |                         |                       |
|-------------------------|-----------------------|
| Helen Bennett Lawtonne  | Kathryn Mildred Towne |
| Vincent James DeAngelis |                       |

\* For purposes of the University and the Dean and Assistant Dean of the School of Education, the following are advisory committees.  
 † Limited to one faculty member.

## GENERAL INFORMATION

### INTRODUCTORY

It is the purpose of the School of Education to prepare teachers, supervisors, and administrators for the higher ranges of educational service and to offer opportunities to teachers of experience to extend their education. The School includes the departments of Education, Physical Education, and Home Economics.\* It offers both graduate and undergraduate work. Other departments of the University provide general education and subject-matter courses needed for a well-balanced program of teacher education.

The schedule of courses is arranged to meet the convenience of both full-time and part-time students. By attending evening, Saturday, and summer classes, teachers in the schools of the metropolitan Washington area and others within commuting range may complete all the requirements for a degree without giving up their positions.

### HISTORICAL DEVELOPMENT

The University began offering professional courses for teachers in 1904-5 and in 1907 it established a Division of Education. In 1909, the Division of Education became the Teachers College which, in its early years, was concerned largely with teacher preparation on the undergraduate level.

In 1928, the Teachers College became the School of Education and greater provision was made for advanced study. Since that time the graduate enrollment has steadily increased with the result that today the School has a considerably larger number of graduate than undergraduate students.

### ADVANTAGES OF STUDY IN THE NATION'S CAPITAL

Washington is rich in the resources needed by teachers to supplement classroom instruction. In addition to the library facilities of the University, the Library of Congress, the Library of the Department of Health, Education, and Welfare, and many special collections provide unequalled opportunities for reading and research. The operation of all branches of the National Government may be observed. Among the art galleries are the National Gallery of Art, the Corcoran Gallery of Art, the Freer Art Gallery, Phillips Memorial Gallery, and the National Museum. The music calendar of Washington is a full one, and includes con-

\* The Department of Home Economics offers a curriculum in home making. Its program is described in a special announcement.



certs by the National Symphony Orchestra, Philadelphia Orchestra, and the Boston Symphony Orchestra. Those interested in science find many resources for study at the National Museum, the National Zoological Park, the United States Botanic Garden and the Aquarium of the Fish and Wildlife Service, Department of the Interior. Teachers have unique opportunities to become acquainted with the work of the Office of Education, the National Education Association, the American Council on Education, and many other national organizations with headquarters in Washington.

#### ACADEMIC STATUS

The George Washington University is accredited by the regional accrediting agency, the Middle States Association of Colleges and Secondary Schools. This is important to students who wish to transfer credits from one institution to another.

The University is on the approved list of the American Association of University Women and is a member of the College Entrance Examination Board.

The School of Education is accredited by the National Council for the Accreditation of Teacher Education, is a member of the American Association of Colleges for Teacher Education, and was a charter member of the National Association of Colleges and Departments of Education prior to the merger of that association with others to form the American Association of Colleges for Teacher Education.

## THE EDUCATION OF TEACHERS

### PROGRAMS LEADING TO THE DEGREE OF BACHELOR OF SCIENCE IN PHYSICAL EDUCATION

#### BACHELOR OF SCIENCE IN PHYSICAL EDUCATION FOR MEN

There are three curricula leading to this degree. The Single-Major and Subject-Certification Teacher's Curriculum is designed to prepare students for teaching positions in smaller schools where it is necessary to teach an academic subject in addition to physical education. The Single-Major Teacher's Curriculum prepares for the teaching of physical education in the larger schools. The Physical Education and Recreation Curriculum has been planned for those who wish to be prepared to direct programs of recreation in addition to the teaching of physical education.

The following courses, to be taken in the Junior College, are required for admission to the School of Education. Students with deficiencies must make up those deficiencies as prerequisite to the Junior College curriculum.

English	English 1, 2	4
Physical Education	1, 2, 3, 11, 12	6 or 8
Science	Earth 1-2 or Zoology 1-2 (Freshman year)	4
Social Studies	History 10-11, 70-72, Political Science 9-10, or Geography 1-2 (Freshman year)	4
	Lawrence, History, or Political Science (Sophomore year)	4
Major Prerequisite	Physical Education 43-44, 47, Speech 1 or 11 (Fresh- man year)	4
	Physical Education 45-46, 49, 50, 58, Psychology 1, 22 (Sophomore year)	18
Elective		12
	Total	54

The minimum requirements for this degree are *thirty-six* hours, distributed as follows:

#### Single-Major and Subject-Certification Teacher's Curriculum

The minimum requirements for this degree are twenty-one semester hours in education, twenty-four hours in physical education, eighteen hours in an academic teaching field, and three hours in philosophy, distributed as follows:

JUNIOR YEAR	Semester Hours	SENIOR YEAR	Semester Hours
Learning and Teaching	6	Common Teaching Skills	3
Society and the School	6	Observation and Student Teaching	6-9
History and Principles of Physical Education	3	Methods and Materials for Teaching Team Sports in Secondary Schools	4
Adapted Physical Education and Physical Examinations	3	Methods and Materials for Health Education	3
Techniques for Teaching Recreational Dance	3	Tests and Measurements in Physical Education	3
Methods and Practice in Teaching Physical Education Activities	4	Organization and Administration in Physical Education	3
Physiology	3	Academic teaching field	11
Academic teaching field	7		
<b>Total</b>	<b>33</b>	<b>Total</b>	<b>33</b>

### Single Major Teacher's Course

The minimum requirements for this degree are twenty-one semester hours in education, twenty-eight hours in physical education, three hours in physiology, and fourteen hours of electives:

JUNIOR YEAR	Semester Hours	SENIOR YEAR	Semester Hours
Learning and Teaching	6	Common Teaching Skills	3
Society and the School	6	Observation and Student Teaching	6
History and Principles of Physical Education	3	Adapted Physical Education and Physical Examinations	3
Techniques for Teaching Recreational Dance	3	Methods and Materials for Health Education	3
Leadership, Organization in the Recreational Program	4	Tests and Measurements in Physical Education	3
Methods and Practice in Teaching Physical Education Activities	4	Organization and Administration in Physical Education	3
Methods and Materials for Teaching Team Sports in Secondary Schools	4	Electives	12
Physiology	3		
Electives	2	<b>Total</b>	<b>33</b>
<b>Total</b>	<b>33</b>		

### Physical Education and Recreation Curriculum

The minimum requirements for this curriculum are 66 semester hours, distributed as follows:

JUNIOR YEAR	Semester Hours	SENIOR YEAR	Semester Hours
Learning and Teaching	3	Common Teaching Skills	3
Society and the School	6	Observation and Student Teaching	6-9
Introduction to Recreation	2		



Techniques for Teaching Recreational Health .....	1	History and Principles of Physical Education .....	3
Leadership Organization in the Instructional Program .....	4	Methods and Materials for Health Education .....	3
Methods and Practice in Teaching Physical Education Activities .....	4	Tests and Measurements in Physical Education .....	3
Camp Leadership .....	1	Organization and Administration of Physical Education .....	3
Recreational Leadership Activities .....	2	Community Organization for Recreation .....	3
Electives .....	—	Administration of Community Recreation Programs .....	3
Total .....	33	Electives .....	1-6
		Total .....	33

#### BACHELOR OF SCIENCE IN PHYSICAL EDUCATION FOR WOMEN

There are three curricula leading to the degree. The Dual-Major Teacher's Curriculum is designed to prepare students for positions in smaller schools where it is necessary to teach an academic subject in addition to Physical Education.

The Single Major Teacher's Curriculum prepares for the teaching of Physical Education in the larger schools. Within this curriculum there is opportunity for specialization in dance, sports, or correctives.

The Physical Education and Recreation Curriculum has been planned for those who wish to be prepared to direct programs of recreation in addition to teaching Physical Education.

The following courses, to be taken in the Junior College, are required for admission to the School of Education:

English .....	English 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	10
Physical Education .....	Physical Education 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	6 or 8
Social Studies .....	Social Studies 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	6
Major Preparation .....	Physical Education 41-44 (Freshman year) .....	8
	Physical Education 45-48 (Sophomore year) .....	16
Academic Electives .....	(Each year) .....	6 or 8
Total .....		34

#### Dual or Single Major Teacher's Curriculum

The student desiring to prepare herself to teach another subject in addition to Physical Education for Women may do so by choosing her elective hours from one subject-matter field with the advice of the Dean of the School of Education. Relevant work completed in the Junior College may be counted in this subject-matter field.

JUNIOR YEAR	Semester Hours	SENIOR YEAR	Semester Hours
Learning and Teaching	6	Society and the School	6
First Aid and Care of Athletic Injuries	2	Observation and Student Teaching	6-6
Physical Education in the Elementary School	3	Methods and Principles in Teaching Physical Education Activities	4
History and Principles of Physical Education	3	School and Community Health Education	3
Adapted Physical Education and Physical Examinations	6	Methods and Materials for Health Education	3
Techniques for Teaching Recreational Dance	1	Tests and Measurements in Physical Education	3
Methods and Materials for Teaching Physical Education Activities in Secondary Schools and Colleges	2	Organization and Administration of Physical Education	3
Methods of Teaching Modern Dance	1	Education	3-6
Dance Production	1	Total	34
Camp Leadership	1		
Physiology	1		
Electives	3		
Total	32		

## Physical Education and Recreation Curriculum

JUNIOR YEAR	Semester Hours	SENIOR YEAR	Semester Hours
Introduction to Recreation	2	Society and the School	6
First Aid and Care of Athletic Injuries	2	Observation and Student Teaching	6-6
Physical Education in the Elementary School	3	History and Principles of Physical Education	3
Adapted Physical Education and Physical Examinations	6	Methods and Principles in Teaching Physical Education Activities	4
Techniques for Teaching Recreational Dance	1	Methods and Materials for Health Education	3
Leadership Organization in the Intramural Program	4	Camp Leadership	1
Methods and Materials for Teaching Physical Education Activities in Secondary Schools and Colleges	2	Organization and Administration of Physical Education	3
Methods of Teaching Modern Dance	1	Community Organization for Recreation	3
Dance Production	1	Administration of Community Recreation Programs	3
Recreational Leadership Activities	3	Total	34-36
Physiology	2		
Electives	3		
Total	34		

## PROGRAMS LEADING TO THE DEGREE OF BACHELOR OF ARTS IN EDUCATION

Programs leading to the degree of Bachelor of Arts in Education have four main objectives: (1) provision of general educational back-

grounds, (2) a functional command of ideas, concepts, knowledges, and skills in one or more teaching fields, (3) a mastery of basic professional information and skills adequate for a beginning teacher, and (4) development of attitudes needed for success in teaching. Since the contents of teaching fields differ in scope and complexity, some programs are longer than others in terms of semester hours. None require less than 120 semester hours of satisfactory work, exclusive of required Physical Education.

Normally, 60-64 semester hours of the total requirement are completed in the Junior College of the University or in an equivalent institution elsewhere.

#### GENERAL EDUCATION

The general educational backgrounds needed by prospective teachers are obtained through: (1) pre-college education, (2) college courses, (3) work experience, (4) leadership activities, (5) participation in student campus activities, and (6) utilization of off-campus cultural opportunities.

*College course requirements.*—Course requirements depend in part upon the senior high school credits presented for college admission. They are as follows:

#### ENGLISH

##### English 1, 2. English Composition

Before students are required to English 1, they are tested by the entrance committee for knowledge of vocabulary, grammar, punctuation, usage, and writing skills. Those students who show marked proficiency may, upon meeting further tests, be exempted from one or both sessions of the English Composition course; those who are exempted presented for English 1 will be assigned to English A.

English 1 is a prerequisite to all other courses in English.

One of the following survey courses is required:

English 51-52. Introduction to English Literature

English 71-72. Introduction to American Literature

English 91-92. Introduction to European Literature

#### FOREIGN LANGUAGES

French, German, Latin, Spanish, or Swedish.

A student planning for admission must acceptably high school work in at least one foreign language, or that otherwise, is not required to take any foreign language. If he offers three units, he must complete the second semester of the second-year course; if he offers two units, he must complete the first semester. If he offers one unit, he must complete the first semester. If he offers no units, he must complete the first semester. If he offers no units, he must complete the first semester. If he offers no units, he must complete the first semester.

#### PHYSICAL EDUCATION

Physical Education 1-2 and 11-12

A student may be exempted from this requirement if required for less than three semesters or intensively engaged during the day.



## SCIENCE AND MATHEMATICS

Two semesters of science or mathematics to equivalent upper high school courses in these fields and chosen from the following . . .	6-8
Biology 1-2: Society in Biology	
Biology 1, 2: Structure and Function of the Flowering Plant	
Survey of the Plant Kingdom	
Chemistry 1-4: Survey of Physical Science	
Chemistry 11-12: General Chemistry	
Mathematics 3 and 6: College Algebra, Plane Trigonometry	
Mathematics 6 and 12: Plane Trigonometry, Analytic Geometry	
Physics 5 and 6, or 6 and 7: General Physics	
Zoology 1-2: Introduction to Zoology	

## SOCIAL STUDIES

History 71-72: The Development of the Civilization of the United States . . .	6
Another Social Science chosen from the following courses . . .	6
Geography 1-2: Principles of Geography	
Geography 51, 52: Introduction to Geography, World Regions	
History 12-13: The Development of European Civilization	
Political Science 9-12: Government of the United States	
Political Science 12-13: History of England	
Sociology 1-2: Introductory Sociology	
A student offering for admission this or more acceptable senior high school units in the Social Studies may be exempted from the second part of this requirement.	

## OTHER COURSES

Psychology 1: General Psychology . . .	3
Psychology 22: Educational Psychology or	
Psychology 23: Child Psychology . . .	3
Speech 1: Effective Speaking . . .	3
Speech 11: Voice and Diction . . .	3
Students who demonstrate marked aptitude in Speech may be exempted from this requirement. Such exemption is granted only on the recommendation of the Department of Speech.	
Statistics 53: Introduction to Statistics in Psychology and Education . . .	3

## ACADEMIC ELECTIVES

Electives may be increased through the various exemptions.

Minimum required credits

*Work experience, leadership activities, participation in student campus activities, and the utilization of off-campus cultural opportunities.*— Obviously, these cannot be prescribed. Nevertheless, they constitute an important part of the general educational background of prospective teachers. In conference with a staff member of the Department of Education assigned as his general adviser, the student is expected to plan

\* Required for those preparing for elementary school teaching.

adequate experiences in these areas. Not later than one month after matriculation in the School of Education the student must file in the Office of the Dean a statement of such plans approved by his adviser. He must also keep his adviser informed concerning the fulfillment of his plans and to this end include in plans filed, scheduled conferences with his adviser.

Success of the student in enriching his general educational background by these means will be taken into consideration at the end of the first semester of the junior year when the faculty will review the qualifications of candidates to determine any who are not of sufficient promise as prospective teachers to warrant continuation of their candidacies. Success in these activities will also be considered when the list of candidates is again reviewed early in the last semester of the senior year immediately after the results of the National Teacher Examinations are available. In estimating the success of the student in this connection, more weight will be given to evidence of initiative, eagerness to make the most of each experience, balance, and quality of experience than to the number of different experiences.

Although the student is not required to establish a program of non-academic activities until he becomes a degree candidate in the School of Education, he is advised to do so as soon as he enters the Junior College. To this end, he should consult with the Junior College adviser of students in the pre-Education curriculum soon after entering the Junior College. Whatever is accomplished in this connection while in the Junior College will reduce the obligations of the student after admission to the School of Education.

#### TEACHING FIELD PREPARATION

Teaching field preparation depends upon the kind of teaching position for which the student is preparing. Those planning to teach in elementary schools need a degree of competency in several fields. Those preparing to teach in junior or senior high schools must demonstrate competency in a major teaching field and a minor teaching field. Ordinarily, students preparing to teach in evening schools for adults are required to prove competency in only one teaching field.

The student should begin teaching field preparation while in the Junior College and should make provision for it in planning his program of studies.

Teaching field requirements include satisfactory completion of prescribed academic courses in one or more fields, a satisfactory score on the special field examination of the National Teacher Examinations, and satisfactory completion of the prescribed special methods courses.

Prescribed academic courses vary in number in accordance with the scope and complexity of the teaching field and the license requirements

of the various states. Minimum academic course requirements for each major teaching field are listed on succeeding pages. Minor teaching-field requirements are somewhat less than those of a major field. They are determined in conference with an adviser.

The prescribed course in special methods is concerned primarily with methods of initiating, guiding, and evaluating learning experiences dealing with the content of the teaching field. It attempts to bring to the student specific suggestions drawn from the accumulated experience of successful teachers. However, in addition, the course reviews the teaching field content currently in use in schools and the examination at the end of the course provides the final test of competency in the teaching field.

### Prescribed Courses in the Various Teaching Fields

#### ART

Two semester courses from the following group.....

- Art 71-72: Introduction to the Art in America
- Art 109: Nineteenth Century Art in Europe
- Art 110: Contemporary Art
- Art 141: Teaching/Designing
- Art 142: Home Planning
- Art 161-62: Drawing and Color

Two semester courses from the following group.....

- Art 101: Ancient Art
- Art 102: Medieval Art
- Art 103: Renaissance Art in Italy
- Art 104: Renaissance Art in the North
- Art 143: Primitive Art
- Art 144: Art of the Far East

Twenty-four semester hours from the following group.....

- Art 48-49: Drawing and Painting I—Life and Still Life
- Art 50-51: Drawing and Painting I—Life, Still Life, and Portrait
- Art 67-68: Drawing and Painting I—Life and Portrait
- Art 81-82: Sculpture I
- Art 125-27: Drawing and Painting II—Life, Still Life, and Portrait
- Art 127-28: Drawing and Painting II—Life and Portrait
- Art 145-47: Drawing and Painting II—Life and Portrait
- Art 175-76: Drawing and Painting II—Life and Portrait
- Art 177-78: Sculpture II
- Art 183-84: Commercial Art

Total.....

#### BIOLOGY

- Biology 1-2: Survey in Biology.....
- Biology 1: Structure and Functions of the Flowering Plant.....
- Home Economics 152: Nutrition.....



Physiology 115: Physiology .....	3
Zoology 1-2: Introduction to Zoology.....	6
*Additional courses, as approved by the adviser.....	12
Total.....	15

## BUSINESS EDUCATION

Accounting 1: Introductory Accounting.....	1
Business 1-2: Principles of Economics.....	2
Secretarial Studies 51: Business Correspondence.....	1
*Additional courses, as prescribed, in one of the following groups.....	

## Group 1—Secretarial Studies†

Secretarial Studies 2: Intermediate Typewriting.....	1
Secretarial Studies 12: Intermediate Shorthand and Transcription.....	1
Secretarial Studies 15: Advanced Shorthand, Typewriting, and Transcription.....	1
Secretarial Studies 16: Secretarial Shorthand, Typewriting, and Transcription.....	1
Secretarial Studies 54: Secretarial Practice.....	2
*Additional courses from the following, as approved by the adviser.....	
Accounting 2: Introductory Accounting.....	
Business Administration 1-1: Business Organization and Com- merce.....	
Business Administration 129: Office Management.....	
Business Administration 141: Principles of Marketing.....	
Business Administration 151: Retailing.....	
Business Administration 161: Commercial Law.....	
Business 141: Money and Banking.....	
Statistics 52: Mathematics of Finance.....	

Total.....

## Group 2—Bookkeeping, Business Arithmetic, and Business Law

Accounting 2: Introductory Accounting.....	1
Business Administration 101: Business Organization and Com- merce.....	1
Business Administration 102: Business Management.....	1
Business Administration 151-52: Commercial Law.....	1
Statistics 52: Mathematics of Finance.....	1

\* One of the following courses, as approved by the adviser.....

Accounting 111: Financial Statement Analysis.....	
Business Administration 121: General Insurance.....	
Business Administration 131: Business Finance.....	
Business Administration 145: Investments.....	
Economics 121: Money and Banking.....	

Total.....

\* Not required for the minor.

† Candidates, successfully selected for Secretarial Studies 2 or 12 may be required to take Secretarial Studies 1 or 11.

## Group 3—Distributive Education

Business Administration 141	Principles of Marketing	3
Business Administration 142	Marketing Problems	3
Business Administration 143	Sales Management	3
Business Administration 151	Retailing	3
*Four of the following courses, as approved by the adviser		12
Business Administration 147	Store Management Problems	
Business Administration 147	Advertising	
Business Administration 148	Principles of Purchasing	
Business Administration 148	Traffic Management and Warehousing	
Business Administration 175	Introduction to Foreign Trade	
Business Administration 175	Exporting and Importing	

Total..... 36

## CHEMISTRY

Chemistry 11-12	General Chemistry	8
Chemistry 21	Qualitative Inorganic Analysis	4
Chemistry 22	Quantitative Inorganic Analysis	4
Chemistry 151-52	Organic Chemistry	6
Chemistry 191	History of Chemistry	2
*One of the following		8-10
Chemistry 111-12 and 113-14	Physical Chemistry	
Biochemistry 221-22	Biochemistry	

Total..... 34-40

## ELEMENTARY EDUCATION

Education 113	Elementary School Arts	3
Education 114	Elementary School Music	3
Education 128	Children's Literature	3
Physical Education 131	Physical Education in the Elementary School	3
Source as approved by the adviser		10-14
History 71-72	Development of the Civilization of the United States	6
Four semesters selected from the following, as approved by the adviser		12
Education 1-2	Principles of Education	
Geography 51, 52	Introduction to Geography, World Regions	
History 59-61	The Development of European Civilization	
Political Science 6-10	Government of the United States	
Religion 59-60	History of Religion	
Sociology 1-2	Introduction to Sociology	

Total..... 36-44

## ENGLISH

English 1, 2	English Composition	6
English 52	Introduction to English Literature	3
English 71-72	Introduction to American Literature	6
English 125	The Evolution of Modern Speech	3

\* Not required for the minor.

English 115-16: Shakespeare	6
Spanish 111: Voice and Diction	3
*Large numbers selected from the following with approval of adviser	7
English 151-162: The Romantic Movement	
English 161-171: Victorian Literature	
English 172-186: The Twentieth Century	
English 171-174: Studies in American Literature	
English 175-176: Major American Poets	
English 176: American Drama	
English 177-78: American Fiction	
English 181: The English Novel	
English 192: Proseman	

Total, . . . . . 36

## FRENCH

French 1-2: First-year French	6
French 3-4: Second-year French	6
French 5-10: French Conversation and Composition	6
French 11-12: Survey of French Literature and Civilization	12
*Additional courses in French as approved by the adviser	

Total, . . . . . 36

## GEOGRAPHY

Geography 51: Introduction to Geography	3
Geography 52: World Regions	6
Geography 100-4: Cartography	3
Geography 113: Geomorphology	3
Geography 114: Weather and Climate	3
Geography 115: Conservation of Natural Resources	3
Geography 142: Urban Geography	6
*Two of the following selected courses	
Geography 151: Western Europe	
Geography 154: The Mediterranean	
Geography 161: Middle America	
Geography 170: South America	
Geography 175: Eastern and Southeastern Asia	
Geography 197: The Pacific	6
Geography 198: Australia	
*Two of the following selected courses	
Geography 115: Economic Geography: Trade and Transportation	
Geography 126: Economic Geography: Raw Materials	
Geography 137: Economic Geography: Manufacture	
Geography 128: Economic Geography: Agriculture	
Geography 142: Land Use	
Geography 141: Geography of Settlement	

Total, . . . . . 96



## GERMAN

German 1-2: First-year German .....	6
German 3-4: Second-year German .....	6
German 51-52: Introduction to German Literature .....	6
*Additional courses in German, as approved by the adviser .....	18
Total .....	36

## HISTORY

History 39-40: The Development of European Civilization .....	6
History 71-72: The Development of the Civilization of the United States .....	6
*Additional semester hours, as approved by the adviser, from each of the following groups .....	18
Group 1—American History	
History 171-72: Social History of the United States	
History 173: Representative Americans	
History 174: Economic History of the United States	
History 181-82: Diplomatic History of the United States	
Group 2—European History	
History 109: Thought and Culture of the Western World I Ancient Civilization	
History 110: Thought and Culture of the Western World II The Middle Ages and Renaissance	
History 130: Nationalism	
History 145-46: Russian History	
History 147: Economic History of Europe	
History 149-50: European Diplomatic History	
History 151-52: English History	
*Group 3—Latin American History	
History 163: Latin American History, Colonial Period	
History 164: South America since Independence	
History 166: Mexico and the Caribbean since Independence	
Political Science 177: Recent Trends in Latin American Politics and Government	
Political Science 178: International Politics in the Western Hemisphere	
*Additional semester hours, as approved by the adviser, from one of the foregoing groups .....	6
Total .....	36

## MATHEMATICS

Mathematics 3: College Algebra .....	3
Mathematics 6: Plane Trigonometry .....	3
Mathematics 12: Analytic Geometry .....	3
Mathematics 19: Differential Calculus .....	3
Mathematics 20: Integral Calculus .....	3
*Mathematics 123: Theory of Equations .....	
*Mathematics 125: Advanced Algebra .....	3

\* Not required for the minor.

•Mathematics 132: Differential Equations, etc.	1
•Mathematics 139: Advanced Calculus	1
•Additional courses in Mathematics as approved by the advisers	3
Statistics 52: Mathematics of Finance	3
<b>Total</b>	<b>27</b>

## PHYSICS

Physics 5, 6, 7, and 8: General Physics	12
Physics 15: Physical Measurements	1
Physics 101: Mechanics	1
Physics 105: Principles of Electricity	1
Physics 106: Optics	1
•Chemistry 11-12: General Chemistry or	
Chemistry 12-21: General Chemistry and Quantitative Inorganic Analysis	8
Mathematics 12: Analytic Geometry	1
Mathematics 19: Differential Calculus	1
Mathematics 20: Integral Calculus	1
•Six semester hours to be selected from the following:	
Physics 102: Heat and Thermodynamics	
Physics 113: Atomic Physics	
Physics 114: Statistical Physics	
Physics 128: Sound	
Physics 131: Electronics	
Physics 135: Advanced Laboratory in Electricity and Magnetism	
Physics 139: Advanced Laboratory in Optics	
<b>Total</b>	<b>47</b>

## SOCIAL STUDIES

History 39-40: The Development of European Civilization	6
History 71-72: The Development of the Civilization of the United States	6
Political Science 9-10: Government of the United States	6
Two of the following courses:	12
Economics 1-2: Principles of Economics	
Geography 51, 52: Introduction to Geography and World Regions	
Religion 57-60: History of Religion	
Sociology 1-2: Introductory Sociology	
•Additional semester courses as approved by the adviser from any of the following fields: Economics, Geography, History, Political Science, Religion, Sociology	12
<b>Total</b>	<b>42</b>

## SPANISH

Spanish 1-2: First-year Spanish	6
Spanish 3-4: Second-year Spanish	6
Spanish 9-10: Spanish Conversation and Composition	12
•Additional courses as approved by the advisers	12
<b>Total</b>	<b>36</b>

\* Not required for the minor.

## SPEECH

Speech 1: Effective Speaking .....	3
Speech 2: Persuasive Speaking .....	3
Speech 11: Voice and Diction .....	3
Speech 32: Oral Reading .....	3
Speech 141: Voice and Phonetics .....	3
Speech 142: Group Discussion and Conference Leadership .....	3
Speech 151: Acting .....	3
Speech 175: Speech Correction .....	3
One of the following areas of specialization, as approved by the advisor:	
*Group 1—Speech Arts .....	12
Twelve semester hours to be chosen from the following:	
Speech 142: Oral Interpretation of Literature .....	
Speech 126: Public Discussion and Debate .....	
Speech 154: Play Production .....	
Speech 166: History of the Theater .....	
Speech 169: Creative Dramatics and Children's Theater .....	
*Group 2—Speech Correction .....	11
Twelve semester hours to be chosen from the following:	
Speech 175: Speech Correction .....	
Speech 177-78: Clinical Practice in Speech Therapy .....	
Speech 142: Introduction to Hearing Problems .....	
Speech 181-84: Clinical Practice in Hearing Therapy .....	
Additional content in English, Physiology, Psychology, or Speech, as approved by the advisor .....	
Total .....	39

## PROFESSIONAL EDUCATION

The basic professional information, skills, and attitudes needed by beginning teachers are provided through a sequence of courses to be taken in the junior and senior years. Lectures and class discussions are closely coordinated with field work. Instruction is differentiated to meet the needs of those preparing to teach on the various levels—elementary school, junior high school, senior high school, and adult.

## Professional Courses—Secondary

Education 120-13: Learning and Teaching .....	6
Education 121-22: Society and the School .....	6
Education 131: Classroom Teaching Skills .....	3
Education 132-34: Observation and Student Teaching .....	6-9
Education 140 to 150: Special Methods .....	3-6
Total .....	24-27

## Professional Courses—Elementary

Education 120-13: Learning and Teaching .....	6
Education 131: Methods in Elementary Education .....	6
Education 141-22: Society and the School .....	6
Education 151-54: Observation and Student Teaching .....	6-9
Total .....	24-27

\* Not required for the minor.



**Learning and Teaching.**—Candidates enrolled in four-year programs leading to the degree of Bachelor of Arts take this course in the junior year. Those enrolled in five-year programs take it in the senior year.

The course attempts to promote a functional understanding of the nature of learning and teaching—characteristics of learning and principles of teaching are presented and discussed in the two one-hour class meetings each week. At least an equal amount of time is spent in observation and study of the application of these characteristics and principles to classroom situations. Class discussion normally revolves around these field experiences.

The course is also intended to provide the student with exploratory experiences of assistance to him in deciding whether to choose the profession of teaching. The student's performance in connection with the course is one of the factors considered when the Faculty reviews the list of candidates who have completed the first semester of the junior year (senior year for those enrolled in five-year programs).

**Society and the School.**—This course is also taken in the junior year by candidates enrolled in four-year programs (senior year by those in five-year programs).

The first half of the course attempts to promote an understanding and appreciation of the role of schools in the sound promotion of the enduring interests of our democratic society. More particularly, it attempts to develop a functional understanding of the contributions of all social agencies in the education of people and of desirable cooperative working relations that help the school to play its part as a member of the institutional "team" of the community.

The second half of the course is concerned with study of the school as a whole—its purposes, program of studies, out-of-class activities, general organization, and major instructional problems. Although schools at all levels are studied, students give particular attention to schools at the level within which they are preparing to teach.

Classes meet for lecture and discussion two hours a week. At least an equal amount of time is spent in field study. During the first half each student studies cooperating social institutions. In the second half extended study of schools at the level of the student's special interest is supplemented by briefer studies of schools at other levels. Class discussion is largely determined by field experiences.

This course is also intended to provide the student with exploratory experiences of guidance value. The performance of the student in the first half of the course is also given careful consideration by the Faculty in its review of the list of candidates at the beginning of the second semester of the junior year (senior year for those enrolled in five-year programs).

*Common Teaching Skills.*—Those enrolled in four-year programs take this course in the senior year. Those enrolled in five-year programs take it in the fifth year.

The course is concerned with the skills needed by teachers in connection with classroom management, teaching techniques, homeroom procedures, administrative routines, activity sponsorship, group planning, and public relations.

Classes meet three hours a week for lecture, discussion, and laboratory. The observation of classroom teaching done in connection with the Observation Course (Education 133), for which students are normally enrolled concurrently, provides the field work of the course.

*Special Methods Courses.*—Associated with each teaching field is a course dealing with its special teaching problems. In addition to the study of practices followed by successful teachers, actual teaching content as found in current texts and courses of study is reviewed. Needed content, not included in academic courses available for teaching-field preparation is taught in these courses.

*Observation and Student Teaching.*—This course is taken in the senior year by students enrolled in four-year programs (in the fifth year by those in five-year programs).

It begins with the observation of classroom teaching in selected situations. Assumption of responsibility for teaching functions is gradual, leading eventually to practice in the complete direction of classroom activities. Those preparing to teach in secondary schools have the opportunity of observing and doing practice teaching in both major and minor teaching fields on the senior high school level. The course is directed by full-time members of the faculty of the School of Education. The work of each student is under the direct supervision of a critic teacher, selected because of unusual success in teaching, ability to supervise, and broad understanding of educational problems. Critic teachers are part-time members of the instructional staff of the School. Observation and student teaching are done in the public schools of the metropolitan area of Washington, assuring practice in situations comparable to those the student is likely to face on becoming a teacher.

#### SPECIAL CURRICULA IN ELEMENTARY EDUCATION

Students preparing for elementary school teaching may also qualify as teachers of French, Spanish, remedial speech, and remedial reading. Programs should be planned in conference with an adviser.

#### ADMISSION

To be admitted to candidacy for the degree of Bachelor of Arts in Education, the applicant must: (1) hold an Associate in Arts degree

based on the Education Curriculum in the Junior College or the equivalent from another accredited higher institution, or a certificate of graduation from an approved normal school or the equivalent; (2) have a quality point index of 2.00 (average grade of C) counting "Incomplete" grades as "F"; (3) have demonstrated a genuine interest in teaching and possess personality traits that give promise of success as a teacher; and (4) have an interview in the Office of the School of Education.

#### FIVE-YEAR PROGRAMS LEADING TO THE DEGREES OF BACHELOR OF ARTS AND MASTER OF ARTS IN EDUCATION

Five year programs are designed: (1) to permit more adequate teaching field and professional preparation, (2) to prepare for special teaching positions, and (3) to meet teaching certificate requirements based upon five years of preparation.

Students in these programs usually devote the junior year to additional teaching-field preparation and general education. Ordinarily, teaching-field preparation is continued in the senior year and the first two professional courses (Education 109-10, 121-22) are taken. The work of the fifth year includes the remaining undergraduate professional courses and the balance of graduate courses needed to meet the requirements of the degree of Master of Arts.

Candidates must have a quality point index of at least 2.50 before beginning the work of the senior year. As much as 18 semester hours of the work of the senior year may be taken for graduate credit. Observation and Student Teaching taken in the fifth year may not be taken for graduate credit.

Candidates enrolled in five-year programs are able to prepare more adequately in their major or minor teaching fields or in both. Additional teaching field courses must be approved by the adviser in the teaching field concerned.

The five year plan of study also provides an opportunity for candidates to prepare to teach "common learnings" courses in one or more of the various core curriculum plans now being adopted in many secondary schools. Such programs need to be carefully planned to meet the demands of the situation in which the candidate hopes to teach.

A number of cities and some states require five years of satisfactory preparation before issuing certain teaching certificates. Candidates seeking such certificates should familiarize themselves with the requirements of the community or state concerned and plan their programs accordingly.

Five year programs must meet all the requirements of the degrees of Bachelor of Arts and Master of Arts in Education, and must be approved by the adviser designated for these programs.



## PROGRAMS LEADING TO THE DEGREE OF MASTER OF ARTS IN EDUCATION

Programs of study leading to the degree of Master of Arts are designed: (1) to enable teachers of experience to increase their knowledge of professional and academic information and skills, (2) to prepare for special types of educational service, and (3) to provide opportunities for graduates of liberal arts colleges to acquire needed professional education.

Programs are planned in conference with the designated Adviser and take into consideration the interests of the candidate, his previous background, and the certification requirements of the state and locality in which he plans to teach.

### PLANS OF STUDY

Two general plans of study lead to the degree.

*Plan 1.*—This plan requires a minimum of 30 hours of graduate credit, including a thesis carrying 6 hours of graduate credit.

*Plan 2.*—This plan requires a minimum of 33 hours of graduate credit, including a course in *Educational Research Methods and Procedures* carrying 3 hours of graduate credit.

Graduate work completed in other accredited institutions of learning may be credited toward the Master's degree, but a minimum of 30 semester hours must be completed in the School of Education of The George Washington University. Not more than nine semester hours of the minimum thirty-hour requirement may be taken in off-campus courses.

Advanced courses completed in excess of the requirements for the Bachelor's degree in this University may be credited toward the Master's degree to the extent of 12 semester hours, provided the work fits in with the student's plan of specialization and is approved in writing by the Dean before being undertaken.

In determining advanced standing at the time of admission or re-admission to Master's candidacy at this University, graduate work completed more than three years previously is not counted.

Under Plan 1, a minimum of 12 semester hours, in addition to the thesis, must be from courses planned primarily for graduate students (third-group courses). Under Plan 2, a minimum of 18 semester hours, in addition to the course in *Educational Research Methods and Procedures*, must be from third-group courses. Under either plan a minimum of 12 semester hours, not including the thesis or the research course, must be from courses offered in the Department of Education.

Programs may provide for additional academic preparation in one or more teaching fields. In such cases, however, undergraduate and

graduate courses combined must be at least equivalent to the undergraduate requirements for the degree of Bachelor of Arts in Education in the teaching field concerned.

Programs are normally based upon undergraduate preparation equivalent to the requirements of the degree of Bachelor of Arts in Education (see pages 12-13). Candidates with less professional preparation must make up their deficiencies either prerequisite to or as part of their graduate study.

Each candidate must file in the Office of the Dean not later than one month after admission to the School of Education a program of study approved by his adviser.

#### COMPREHENSIVE EXAMINATION

In addition to the course examinations, the candidate must pass a professional comprehensive examination in two parts: (1) a general examination concerned with an integrated understanding of the major areas in professional education, and (2) a special examination concerned with the candidate's area of specialization.

The general part of the comprehensive examination is divided into three groups as follows: Group I (Foundations) covers learning and teaching, society and the school, child and adolescent growth and development, history of education, philosophy of education, and educational research; Group II (Major Levels) covers elementary education, secondary education, adult education, employee training, vocational education and physical education; Group III (Common Elements) covers administration, curriculum, evaluation, guidance, methodology, and reading.

The candidate must be prepared to answer two questions in each group, none of which shall include his area of specialization.

#### PROGRAMS OF STUDY

##### Secondary Education—Senior or Junior High School

Students interested in secondary school teaching whose undergraduate degrees are in professional education are encouraged to strengthen their teaching-field preparation by including in their programs of study content courses.

Programs include, in addition to teaching-field courses six semester hours in Secondary Education, and an additional twelve semester hours of work chosen from the following professional courses: *Administrative Education*, *Adolescent Growth and Development*, *Contemporary Problems in Education*, *Curriculum*, *Evaluation*, *Extra-classroom Activities*, *Group Procedures in Education*, *Guidance in Secondary Schools*, and *History of Education*.

### School Administration—Secondary School Principalship or Elementary School Principalship

Programs of those interested in the position of principal customarily include *The Teacher and School Administration*, *The Teacher and School Supervision* and either *Secondary School Management or Administration of Elementary Education*. Additional courses are chosen as needed from *Adult Education*, *Curriculum*, *Elementary Education*, *Guidance*, *Public Relations*, *School Law*, *Planning the School Plant*, and *Secondary Education*.

### Adult Education

Programs of those particularly interested in the education of adults may or may not include additional teaching-field preparation. In addition to six semester hours of work in *Adult Education* professional courses may be chosen from *Audio-visual Education*, *Contemporary Problems in Education*, *Curriculum*, *Employee Training*, *Evaluation*, *Group Procedures in Education*, *Guidance*, *History of Education*, and *Mental Hygiene*.

### Elementary Education—Intermediate Grade or Early Childhood Education

Programs customarily include either *Elementary Education* or *Early Childhood Education* with additional courses chosen from *Audio-visual Education*, *Child Growth and Development*, *Children's Literature*, *Group Contemporary Problems in Education*, *Curriculum*, *Education of the Exceptional*, *Elementary School Classroom Procedures*, *Evaluation*, *Group Procedures in Education*, *History of Education*, *Mental Hygiene*, *Reading Problems*, and *Speech Correction*.

### Curriculum

Programs of those interested in specializing in curriculum development include six semester hours of work in *Curriculum* with additional courses chosen from *Adolescent Growth and Development*, *Adult Education*, *Audio-visual Education*, *Child Growth and Development*, *Course of Study Construction*, *Elementary Education*, *Evaluation*, *Extra-classroom Activities*, *Group Procedures in Education*, and *Secondary Education*.

### Employee Training

Programs for those interested in the training of employees in business, industry, and government normally include courses in *Employee Training* and *Adult Education*. Additional courses are chosen from *Audio-*



visual Education, Contemporary Problems in Education, Curriculum, Guidance, Mental Hygiene, Personnel Psychology, Public Relations, and Techniques of Counseling.

#### Guidance

Programs for those especially interested in guidance usually include courses in Educational and Vocational Guidance, Techniques of Counseling, Guidance in Secondary Schools, and Occupational and Educational Information. Additional courses frequently chosen include Adult Education, Contemporary Problems in Education, Curriculum, Employee Training, Evaluation, Group Procedures in Education, Individual Psychological Testing, Personnel Psychology, Psychological Tests, Secondary Education, and Test Construction.

#### Reading

Programs for those especially interested in developmental and remedial reading include courses in Reading Problems and the Clinical Study of Reading Problems. Additional courses are chosen from Child Growth and Development, Contemporary Problems in Education, Curriculum, Education of the Exceptional, Education of the Slow Learner, and Education of the Gifted.

#### ADMISSION

To be admitted to candidacy for the degree of Master of Arts in Education the applicant must: (1) hold a Bachelor's degree from an accredited institution; (2) have an undergraduate quality point index of 2.50 or above (C + average); (3) have demonstrated a genuine interest in teaching; (4) be in possession of personality traits that give promise of better-than-average success as a teacher.

To be admitted to candidacy in programs designed to prepare for service in guidance and administration two years of successful teaching experience are prerequisite. Candidates who have had no professional courses must satisfactorily complete the required undergraduate professional courses, including Observation and Student Teaching, in addition to graduate course requirements.

#### THE ADVANCED PROFESSIONAL CERTIFICATE

Upon the satisfactory completion of the program of advanced graduate studies of the School of Education, the Advanced Professional Certificate is granted. This program is designed to prepare teachers and administrators for more effective service in their chosen fields and to enable them to qualify for a higher step in the local salary scale.

The program of studies leading to the certificate is selected by the candidate and his adviser from the various related departments of the

University in accordance with his needs. In general it includes thirty hours of graduate credit beyond the Master's degree. The candidate wishing to increase his teaching proficiency may include additional study in his teaching field.

#### ADMISSION TO CANDIDACY

A Bachelor of Arts degree in Education or Bachelor of Science degree in Physical Education from the School of Education, or the equivalent from another institution of higher learning; a Master's degree, from an accredited institution, at least two years of successful teaching experience, and a permanent teaching or administrative license are required. The applicant who is unable to meet the admission requirements may be admitted with deficiencies to be met by satisfactorily completing prerequisites in addition to the specified program of graduate study. Each applicant must be interviewed by a member of the Faculty of the School of Education. The applicant seeking to qualify for a higher level in the local salary scale must have his program approved by the appropriate representative of the school system employing him.

#### TRANSFER OF CREDIT

Appropriate graduate work completed in other accredited higher institutions may be credited toward the requirements for the Certificate, but a minimum of eighteen semester hours must be completed at The George Washington University as a matriculated candidate in the School of Education. The candidate is encouraged to include in his program study at other accredited higher institutions when such study seems to be in his best interest. In determining advanced standing at the time of admission or readmission to Certificate candidacy, graduate work completed more than three years previously is not counted.

#### REQUIREMENTS FOR THE CERTIFICATE

##### Plans of Study

In planning his program of studies the candidate should give first consideration to his particular needs. If he is a teacher and his graduate study leading to the Master's degree was largely in professional education, he may find it desirable to emphasize additional mastery of his teaching field. If his Master's preparation was in a content field, he may wish to devote a major part of his program to additional professional study. Those in administration and related services may wish to continue specialization on a more advanced level.

The program of study must include, in addition to any prerequisites a minimum of thirty hours of graduate credit in third group courses and not less than twelve semester hours in courses offered by the School of Education.

#### RESIDENCE

Candidates for the Advanced Professional Certificate must complete satisfactorily at this University a minimum of eighteen semester hours in courses offered on the campus. The balance of the program may be in the College of General Studies off-campus courses or in other approved institutions of higher learning. The candidate is not required to pursue his program of study continuously. On request, a leave of absence is granted to the candidate for a period not to exceed three years.

#### PROGRAM LEADING TO THE DEGREE OF DOCTOR OF EDUCATION

The requirements for the degree of Doctor of Education cannot be stated in semester hours, but they consist in general of at least two full years of work beyond the degree of Master of Arts in Education or the equivalent. The programs of study are designed to prepare students for administrative or supervisory positions, the teaching of education in normal schools or colleges, the teaching of an academic subject in schools or colleges, or for specialized types of educational service. The work is given a practical rather than a theoretical bent, and emphasizes the mastery and application of subject matter, both in the study requirements and in the dissertation. Special emphasis is placed upon the professional success of the candidate.

The candidate's program of study depends for the most part upon his previous educational background and his professional objective. Opportunities are provided for study leading to the following professional objectives:

School Superintendent  
Secondary School Principal  
Elementary School Principal  
Supervisor

Director of Guidance  
Director of Curriculum Development  
Professor of Education  
Specialist in Educational Research

#### QUALIFICATIONS OF THE APPLICANT

The candidate for the degree of Doctor of Education must have completed (1) graduate work in fields prerequisite to his objective, equivalent to that required for the degree of Master of Arts in Education in The George Washington University, and (2) at least three years of successful educational experience.



#### ADMISSION TO CANDIDACY

To be admitted to candidacy for the degree the applicant must be accepted by the Committee on Graduate Studies on the basis of an examination which will usually include the following: (1) a written examination involving problems related to the applicant's background; (2) a scholastic-aptitude test; (3) an oral examination.

#### CONSULTATIVE COMMITTEE

If the applicant is accepted as a candidate, his consultative committee, in cooperation with the candidate, will (1) determine the candidate's fields of study, in each of which the candidate must pass a written examination at least eight months before he presents himself for the degree; (2) formulate a list of course requirements and of readings that will assist him in preparing for these examinations; and (3) designate the tools of investigation that will be needed by the candidate in the prosecution of his study. These tools may include one foreign language, or more, statistical methods, historical criticism, or any others considered essential by the committee. An examination in the tools designated must be passed by the candidate before he takes his comprehensive examination.

#### THE DISSERTATION

When the candidate has satisfied the requirements of his consultative committee, the committee is dissolved. A member of the faculty, in whose field the topic of the dissertation falls, is then appointed to serve as the candidate's adviser on his dissertation and in his field of specialization, and to recommend him to the Dean for the final oral examination when, in his judgment, the candidate's dissertation is acceptable.

Not later than the date specified in the University calendar the candidate shall submit to the Dean of the School of Education three copies of his dissertation—one typewritten original and two legible and complete carbon copies, on official thesis paper—and also a typewritten summary of the dissertation consisting of not more than 3,500 words. Requirements regarding the form of the dissertation are stated in the general catalogue and additional information will be supplied by the Dean.

The successful candidate is required, before receiving his degree, to pay a fee to cover the expense of printing the summary of his dissertation.

#### THE FINAL EXAMINATION

At least three weeks before the degree is to be conferred the candidate must pass an oral examination on his dissertation and on his field of specialization before a committee of the Faculty appointed by the

Dean, supplemented by two experts from outside the University. This examination is open to the public and all are privileged to question the candidate. The Dean, or a member of the Faculty designated by him will preside at this examination.

#### READING CLINIC

To help children and adults with reading difficulties the University operates a diagnostic and corrective reading clinic. Children may be referred by principals, teachers, or parents. Adults may apply by telephone.

To arrange for a clinical examination of reading status, address The George Washington University Reading Clinic, 802 Twenty-first Street, N.W., or telephone STetling 3-0280, Extension 491, for an appointment. The Clinic is open for appointments Monday through Friday, from 9:00 A.M. to 5:00 P.M.

A complete diagnostic examination usually requires the greater part of a day. When completed, a written report is given and a conference arranged at which disabilities are discussed in detail and suggestions for corrective work are outlined. The fee is \$25.

#### SPECIAL CURRICULA

The School of Education provides special curricula for liberal arts graduates, housewives, and retired military personnel who wish to prepare for teaching. It also provides a wide range of courses of interest to (1) emergency teachers who wish to qualify for teaching certificates and (2) teachers who wish to renew licenses. Leaflets describing these curricula may be obtained on request.

## REGULATIONS

*Students in the School of Education are subject to, and are expected to familiarize themselves with, the general University regulations stated in the University catalogue.*

### REGISTRATION

Before a student may be admitted to registration he must have satisfied the Office of the Director of Admissions that he is qualified to enter the University.

A student who has previously matriculated in the University, but who has not been in attendance during the semester prior to registration, should file an application for readmission in advance of registration.

Registration is for the semester unless otherwise indicated on the registration paper. No registration is accepted for less than a semester or one summer session.

A student may not register concurrently in The George Washington University and another institution without the permission of the Dean. Allowance of credit for work done concurrently will be at the discretion of the Committee on Admission and Advanced Standing.

### AMOUNT OF WORK

Fifteen to seventeen semester hours of credit constitute a normal program. A student with a quality point index of 3.00 or higher, may, with the permission of the Dean, enroll for eighteen or nineteen hours. No student may enroll for more than nineteen, except by permission of the Committee on Scholarship.

A student with extra-curricular employment of fifteen hours or less a week is permitted to carry a normal program of college work.

A student with extra-curricular employment of from sixteen to twenty-five hours a week may enroll for twelve or thirteen hours. Such a student with a quality point index of 3.00 or higher may, with special permission of the Dean, enroll for fifteen or sixteen hours.

A student with extra-curricular employment of from twenty-six to thirty-four hours a week may enroll for nine or ten semester hours. Such a student with a quality point index of 3.00 or higher may, with special permission of the Dean, enroll for twelve or thirteen hours.

A student with extra-curricular employment of thirty-five hours or more a week may enroll for six or seven semester hours. Such a student with a quality point index of 3.00 or higher may, with special permission of the Dean, enroll for nine or ten semester hours.

A student who increases his hours of employment subsequent to regis-



tration or at any time during a semester is required to report that fact immediately to the Dean so that his program may be brought within the limitations outlined above.

#### ATTENDANCE

A student is not permitted to attend classes until registration has been completed and fees due have been paid. Regular attendance is required. A student may be dropped from any course for undue absence.

#### PROBATION

An undergraduate student who fails to maintain a quality point index of at least 2.00 will be placed on probation. A student remains on probation as long as his quality point index is below 2.00, or until his probation is removed by the Committee on Scholarship.

#### SUSPENSION

An undergraduate student on probation who fails to raise his quality point index to 2.00 within the time specified by the Committee on Scholarship may be suspended. An undergraduate student who fails to make passing grades in one half or more of a minimum of 10 semester hours of course work may be suspended.

A student who has been suspended, either for delinquency in payment of fees or for any other reason, is not permitted to attend classes during the period of suspension.

A student who has been suspended for poor scholarship may within ten days appeal his case to the Committee on Scholarship through the Dean. If the case appears to be remediable and the student appears likely to improve in his scholarship thereafter, the Committee may readmit him on probation. A student who has been denied readmission on probation may petition the Committee on Scholarship through the Dean for readmission after the lapse of a calendar year. A student who has been suspended twice will not be readmitted.

#### WITHDRAWAL

Withdrawal from a course or from the University, without academic or financial penalty, requires the permission of the Dean. Permission to withdraw from the University will not be granted a student who has not a clear financial record.

Withdrawal between October 31 and the end of the fall semester and between February 28 and the end of the spring semester is permitted only in exceptional cases.

All charges for courses dropped without the approval of the Dean must be met by the student. Reporting the dropping of a course to an institution does not effect its discontinuance.

### CHANGES IN PROGRAM OF STUDIES

*Changes within the School.*—A student may not change or drop courses (see "Withdrawals", above) or change his status to that of auditor except with the approval of the Dean, upon presentation of adequate reasons for such changes.

Change from one section to another of the same course may be made with the approval of the Dean and the department concerned.

Change from one major subject to another within the same college or school may be made with the approval of the Dean. All requirements specified in the course of study to which the change is made must be satisfied before graduation.

*Transfers within the University.*—Transfer from one college, school, or division to another may be made only with the approval of the deans concerned. Application for transfer must be made to the Director of Admissions on the proper form provided by his office.

In order to provide degree candidates with proper academic counsel and the benefits of integrated programs of study, the faculties of the various schools and colleges have established minimum residence requirements and regulations with regard to supervision of the work done in the student's major field. In addition, various special regulations regarding course sequence, selection of electives, and advisory approval of programs apply in particular curricula. Students transferring within the University are advised to study carefully the graduation requirements and to note that in all undergraduate divisions 30 semester hours, including at least 12 semester hours in the major field, must be completed in residence in the school or college from which the degree is sought. Upon transfer the student should consult the dean concerned and understand clearly all the requirements he must fulfill.

### SUMMER SCHOOL CREDIT

A student who plans to attend summer school sessions at another institution with the intention of having credits so obtained apply toward graduation from this University must first secure the written approval of the Dean. In no event will such credits be recognized to an amount in excess of that which might be earned in a similar period in this institution.

### GRADUATION REQUIREMENTS

To be recommended for graduation a student must have met the admission requirements of the college or school in which he is registered, completed satisfactorily the scholarship curriculum, residence, and other requirements for the degree for which he is registered, and be free from all indebtedness to the University.

*Application for Graduation.*—Application for a degree should be filed

in the Office of the Registrar at the time of registration for the last term of the senior or final year.

*Scholarship.*—The undergraduate student must maintain a quality point index of at least 2.00.

The graduate student must maintain a quality point index of 3.00.

*Residence.*—A minimum of one year, or thirty semester hours, including at least twelve hours in the major field, must be completed in residence. Not more than nine hours of the residence requirement may be satisfied by off-campus courses. Summer work may be counted in residence, but in no case may the period of residence aggregate less than thirty weeks. Unless special permission is granted by the Dean to pursue work elsewhere, the work of the senior or final year must be completed in residence.

The graduate student must meet the residence requirements for the particular degree for which he is registered.

With the permission of the Dean a student may be granted leave of absence; such student should, however, remain technically in residence by paying the residence fee for each semester he is absent. For the purpose of this regulation, the summer session will not be considered a semester.

*Attendance and Conduct.*—The University reserves the right to refuse to confer a degree upon a candidate whose attendance or conduct has been unsatisfactory.

*Presence at Graduation.*—A candidate is required to be present at the graduation exercises unless written application for graduation in absentia is approved by the Dean.

## THE LIBRARY

A student registered in the University is entitled to the reference use of the University Library. The Student Identification Card, issued upon the payment of fees, must be presented as identification.

Library books, with the exception of those in the Law and Medical collections, may be drawn for home use for a period of two weeks. Any book which does circulate is subject to recall by the Librarian at any time. Reserve books and periodicals for collateral reading must be used in the reading rooms when the Library is open. With special permission they may be drawn for overnight use when the Library closes. A fine of twenty-five cents will be charged for the first hour or fraction of an hour and five cents for each hour or fraction thereafter that a reserve book is overdue. Grades of a student will be withheld until his library record is clear.



## HOURS

The University Library is open from 9:00 A.M. to 10:00 P.M. each class day (Saturday 9:00 A.M. to 5:00 P.M.), and from 2:00 to 6:00 P.M. on Sunday.

## FEES AND FINANCIAL REGULATIONS

By authorization of the Board of Trustees, the following fees have been adopted:

## TUITION FEES

For each semester hour for which the student registers (credit work taken by a resident for a Doctor's degree).....	\$48.00
For the degree of Doctor of Education.....	54.00
For work* leading to and including the general examination.....	54.00
For work leading to and including the final examination.....	54.00

## ADDITIONAL COURSE FEES

In certain courses additional fees, such as laboratory and material fees, are charged as indicated in the course descriptions. These fees are charged by the various departments, unless otherwise indicated, may be deferred in circumstances when the student is poor in this manner. Bookkeeping of expenses is carried against the individual student. When bookkeeping is closed at the month's amount provided for in the laboratory fee the individual student will be required to pay such additional charges as are determined by the department concerned.

## GRADUATION FEES

Within a degree is required.....	25.00
Within an Advanced Professional Certificate is awarded.....	25.00
For the Illinois Master's Thesis.....	5.00
For the Printing Summary of Doctoral Dissertation.....	85.00

## SPECIAL FEES

Application fee, charged each applicant for admission, non-resident fee.....	5.00
Late-registration fee, charged each student who fails to register within the designated period.....	5.00
Change fee, charged each student for each change in semester in advance of the first day of class.....	2.00
Withdrawal fee, charged each student who precariously and withdraws prior to the regular registration.....	5.00
Service fee, charged each student for late payment of tuition (see "Payment of Tuition").....	2.00
Reinstatement fee, charged each student who is reinstated after suspension for delinquency in fees.....	5.00
Readmission fee, charged each student wishing to resume "in withdrawal" status during any subsequent session from the University or else, suspended or public punishment.....	15.00
For special physical examinations.....	2.00
For each examination, to satisfy the admission standing and for each special examination.....	5.00
Laboratory checkout fee, charged each student by department expense who fails to check out of the laboratory by the time set by the department.....	1.00
Thesis fee, charged for each examination of thesis after the first.....	1.00

\* This fee does not cover the cost of travel for students coming from outside the State.

Registration in the University entitles each student to the following University privileges: (1) the issuance of one certified transcript of record, if and when desired; (2) the services of the Placement Office; (3) the use of University library facilities, except as otherwise designated; (4) gymnasium privileges; (5) admission to all athletic contests, unless otherwise specified; (6) subscription to the *University Hatchet*, the student newspaper; (7) admission to University debates; (8) medical attention and hospital services as described in the General Catalogue. These privileges, with the exception of the issuance of transcripts, terminate, and a student is no longer in residence, when he withdraws or is dismissed from the University.

#### PAYMENT OF FEES

All fees are payable at the Office of the Cashier, 725 Twenty-first Street N.W. No student is permitted to complete registration or to attend classes until all fees are paid. Fees for each semester are due and payable in advance at the time of registration.

In exceptional cases, subject to the approval of the Treasurer, the student may sign a contract for semester charges, except for fees payable in advance, permitting payments as follows:

*Fall Semester:* One third at the time of registration, one third on November 1, one third on December 2.

*Spring Semester:* One third at the time of registration, one third on March 1, one third on April 1.

A student who fails to meet payments when due, but who pays his fees from the fourth to the fifteenth of the month in which payment is due, is charged a service fee of \$2. A student who fails to meet payments by the fifteenth of the month in which payment is due will be automatically suspended and may not attend classes until he has been officially reinstated and has paid all accrued fees and a reinstatement fee of \$5.

A student suspended for failure to meet payments when due may not be reinstated for the semester after two weeks from the date of suspension. Applications for reinstatement are to be made to the Office of the Cashier.

An auditor pays all fees chargeable to the student registered for credit except the late registration fee.

#### WITHDRAWALS AND REFUNDS

Application for withdrawal from the University or for change in class schedule must be made in person or in writing to the Dean. Notification to an instructor is not an acceptable notice.

In authorized withdrawals and changes in schedules, financial adjustments will be made as follows:

*Fall Semester.*—Withdrawal dated on or before October 31, cancellation of two-thirds of tuition charges; withdrawal dated on or before November 30, cancellation of one-third of tuition charges. No refund or reduction will be allowed on a withdrawal dated subsequent to November 30.

*Spring Semester.*—Withdrawal dated on or before February 28, cancellation of two-thirds of tuition charges; withdrawal dated on or before March 31, cancellation of one-third of tuition charges. No refund or reduction will be allowed on a withdrawal dated subsequent to March 31.

In no case will a refund be made of the first third of the total tuition charges unless the registration is in advance and is cancelled before the regular registration day. In this case a withdrawal fee of \$5 is charged and tuition fees refunded. In no case will tuition be reduced or refunded because of nonattendance upon classes.

Payment applies only to the semester for which a registration charge is incurred and in no case will this payment be credited to another semester.

Any student in chemistry who fails to check out of the laboratory on or before the date set by the instructor, unless excused by the instructor, will be charged a checkout fee in the amount of \$5. A student who drops a course before the end of the semester must check out of the laboratory at the next regular laboratory period.

Any student enrolled in the Air Force ROTC who fails to turn in uniforms, equipment, and textbooks, on separation from the Corps, will be charged the value of the missing items.

Authorization to withdraw and certification for work done will not be given a student who has not a clear financial record.

#### RIGHT TO DISMISS STUDENTS

The right is reserved by the University to dismiss or exclude any student from the University, or from any class or classes, whenever, in the interest of the student or the University, the University Administration deems it advisable to do so.

#### RIGHT TO CHANGE RULES

The University and its various colleges, schools, and divisions reserve the right to modify or change requirements, rules, and fees. Such regulations shall go into force whenever the proper authorities may determine.

#### PROPERTY RESPONSIBILITY

The University is not responsible for the loss of personal property in any University building. A "Lost and Found" Office is maintained in the Student Union.



## COURSES OF INSTRUCTION

The University reserves the right to withdraw any course announced.

### EXPLANATION OF COURSE NUMBERS

*First-group courses.*—Courses numbered from 1 to 100 are planned for students in the freshman and sophomore years. With the approval of the adviser and the Dean, they may also be taken by juniors and seniors. In certain instances, they may be taken by graduate students to make up undergraduate deficiencies or as prerequisite to advanced courses, but they may not be credited toward a higher degree.

*Second-group courses.*—Courses numbered from 101 to 200 are planned for students in the junior and senior years. They may be credited toward higher degrees only when registration for graduate credit has been approved at the beginning of the course by the Dean of the School of Education and by the officer of instruction concerned, and when the completion of additional work has been certified by the officer of instruction.

*Third-group courses.*—Courses numbered from 201 to 300 are planned primarily for graduate students. They are open, with the approval of the officer of instruction, to qualified seniors.

### INDICATION OF THE AMOUNT OF CREDIT

The number of semester hours of credit given for the satisfactory completion of a course is indicated in parentheses after the name of the course. Thus, a year course giving three hours of credit each semester is marked (1-3), and a semester course giving three hours of credit is marked (3).

### DEPARTMENT OF EDUCATION

Courses offered by the Department of Education are of two types: those designed for the preservice education of candidates and those planned for the inservice education of teachers.

Preservice courses devote two fifty-minute periods a week to lecture and discussion supplemented by a minimum of two hours a week of related field work. A clinical approach to the study of educational problems is used: lectures and discussions revolving around observed practices.

Inservice courses usually meet only once a week for a two-hour period. Class work is supplemented by extensive reading assignments.

the preparation of reports, and field work. A student enrolled in one of these courses should plan to devote not less than seven hours a week, exclusive of class time, to the work of the course.

Ample opportunity is provided to study teaching or administrative problems of special interest. To enable students to consult with instructors regarding individual problems, a conference hour is scheduled immediately before or after the class period.

Only the courses designed to provide professional information and skills are listed below. For courses needed for general education or teaching-field preparation, see the general catalogue. In addition to courses offered in the Department of Education a number of professional courses for teachers are offered in the departments of Psychology, Speech, and Statistics. These are listed below together with courses offered by the Department of Education.

Whenever possible, the exact hour of class meeting is stated. Hours for classes not yet scheduled may be found in the Schedule of Classes for the semester concerned.

# FIRST GROUP

Education A *Reading Clinic* Coloman and Staff

Diagnosis of reading difficulties, individual or group, based on written reading tests. For one diagnosis, \$45; for individual work, \$15.00; for group work, \$25.00 (material fee \$4).

Psychology 22 *Introduction to Educational Psychology* (3) Lymb, Lindley

Fall—TU 8:00-9:15 P.M.; Spring—meeting, session 1917.  
Consideration of individual and group differences, adjustments, and the psychology of learning as related to education and training.

Psychology 29 *Child Psychology* (3) F. Johnson

Fall—MW 5:45-7 P.M.; Spring—meeting, session 1917.  
A general approach to the study of the child. Special emphasis is placed on the socialization process, learning, and the child's view of the world.

Statistics 53 *Introduction to Statistics in Psychology and Education* (3) The Staff

Fall, lecture section A—TU 10:10-11 A.M.; section B—MW 7:45-8:15 P.M.; laboratory section M—T 11:10-12:10 P.M.; section N—Th 1:10-2:30 P.M.; section P—Th 4:10-4:30 P.M.; section Q—M 8:00-10:10 P.M.; section R—W 8:00-10:10 P.M. Spring—meeting, session 1917.  
Survey of data tabulation, charts and graphs, average, dispersion, correlation and regression, new tests and beyond them, pooling, testing and their uses, measures of variability, probability and other quantitative fields, and validity of tests, normal curve, correlation, elementary statistics, individual work, instruction in statistics. Prerequisite: one semester work in algebra. Laboratory fee, \$5.

## SECOND GROUP

Statistics 105 *Statistics in Psychology and Education* McCall  
(3)

Spring: lecture (2 hours), laboratory (2 hours)—morning.

Advanced study of statistical techniques necessary for an appreciation of statistics in research problems. Analysis of variance, correlation techniques, chi-square applications, and sampling theory. Applications to specific problems utilizing same method of study as in far as possible. Original work is required of each student. Prerequisite: Statistics 55. Laboratory fee, \$2.

Education 109-110 *Learning and Teaching* (3-3) McCauley

Lecture (2 hours), conference (1 hour), field work (2 hours) as arranged.

First half—Fall: section A—M 1:10-3 P.M., section B—W 6:10-8 P.M., section C—F 10:10-12 A.M., summer 1957.

Second half—Fall: F 1:10-3 P.M. (spring); section A—M 1:10-3 P.M. section B—W 6:10-8 P.M.; summer 1957.

For the general student as well as the prospective teacher. First half covers the learning approach through the study of classroom activities. Second half, nature of teaching illustrated through observation of classroom situations.

Education 111 *Methods in Elementary Education* (6) LaBue

Fall—Th 9 A.M.-4:30 P.M.

For students in the elementary school curriculum. An integrated methods course dealing with the learning experiences designed to meet the developmental needs of children in the natural and social sciences, the language arts, and concepts of civics. Also includes the study of general classroom conditions and the conducting of group activities. To be taken concurrently with Education 105. Prerequisite: Education 102-103 and 110-112.

Education 113 *Elementary School Art* (3) Nowlin

Fall: section A—T 6:10-9 P.M., field work as arranged; section B—Th 6:10-9 P.M., field work as arranged; summer 1957 (Crump).

For majors in the elementary school curriculum. Materials and methods. Prerequisite: Psychology 1 and 2. Material fee, \$4.50.

Education 114 *Elementary School Music* (3) Reed

Spring—T 7:35-9:15 A.M., field work (2 hours) as arranged.

For majors in the elementary school curriculum. Materials and methods. Prerequisite: Psychology 1 and 2.

Education 115 *Teaching of Reading in the Elementary School* (3) Hanigan

Fall—F 6:10-8:00 P.M., field work (2 hours) as arranged.

A basic course in methods, techniques, materials, and activities essential to a good elementary school reading program. Prerequisite: Education 109-110 and 111-113 or teaching experience.



- Education 116 *Elementary School Social Studies* (3) St. Cyr  
 Spring—F 7:10-9 P.M., field work (2 hours) as arranged, summer 1957 (LaBue)  
 For teachers. Content and methods of teaching. Prerequisite: Education 109-110 and 121-22 or teaching experience.
- Education 117 *Elementary School Science* (3) St. Cyr  
 Fall—T 6:10-9 P.M., field work as arranged.  
 For teachers. Materials and methods. Prerequisite: Education 109-110 and 121-22 or teaching experience.
- Education 120 *Elementary School Arithmetic* (3) St. Cyr  
 Spring—Th 7:45-9:45 P.M., field work (2 hours) as arranged, summer 1957.  
 For teachers. Content, materials, and methods. Prerequisite: Education 109-110 and 121-22 or teaching experience.
- Education 121-22 *Society and the School* (3-3) St. Cyr  
*First half*—Fall, section A—W 1:10-3 P.M., field work MW 3:10-4 P.M.; section B lecture—M 5:10-8 P.M., field work MW 8:10-9 P.M., Summer 1957. *Second half*—Fall, Th 1:10-3 P.M., field work TH 3:10-4 P.M.; section A—W 1:10-3 P.M., field work MW 3:10-4 P.M.; section B lecture—M 5:10-8 P.M., field work MW 8:10-9 P.M., Summer 1957.  
 For the general student as well as the prospective teacher. *First half* the local, national, and international issues of educational cooperation in the school with other community agencies. *Second half* organization and operation of schools, principles and functions.
- Psychology 121 *Educational Psychology* (3) Faith  
 Fall—as arranged, spring—as arranged.  
 Advanced course in educational psychology. Admission by permission of the instructor.
- Education 128 *Children's Literature* (3) Walker  
 Spring—M 7:10-9:10 P.M., field work (2 hours) as arranged.  
 For interest in the elementary school curriculum. Exploring and evaluating the newer books for children and the children's classic, understanding the contribution of literature to child development, appreciating children's original expressions. Prerequisite: Psychology 1 and 29.
- Psychology 129 *Introduction to Counseling and Guidance* (3)  
 Fall—Th 6:10-7:25 P.M.  
 A survey of the basic principles, techniques, and procedures as applied to vocational, educational, and personal counseling.

Education 131 *Common Teaching Skills* (3)

Detwiler

Fall—MW 12:30-1:45 P.M., 131B—MTW 4:30-5:45 P.M.

For persons in the elementary school curriculum. Course that, at 3 sessions, presents practical techniques used in connection with motivation, the assignment, group procedure, directing study, individual and group, evaluation, physical instruction, discipline, the classroom, activity management, public relations. Prerequisite: Education 120-1 and 121-22.

Psychology 131 *Psychological Tests* (3)

Hunt

Fall—TTu 11:15 A.M.-12:25 P.M., 131B—Spring, section 131C.

A survey of psychological tests and their uses in research and in human, social, industry, government, law, medicine and education. May be taken for 87.

Education 133-34 *Observation and Student Teaching* (3-3 to 6)

Detwiler, LaBue, McCauley

A year course, grade is not given for the first six with the second half completed.

133A and 133B: fall—spring, 133C: spring—as arranged. 134A, 134B, and 134C: spring—as arranged.

For persons in the elementary or secondary school curriculum. Section A is a year course for students in the elementary school curriculum. Section B is a year course for students in the secondary school curriculum. Section C is for students enrolled in the graduate program. Education 134 student-teaching fee, \$75. Admission to teachers of the institution. Prerequisite: Education 120-1 and 121-22.

Psychology 141 *Leadership, Group Behavior, and Student Life* (3)

Faith

Fall—TTu 11:15 A.M.-12:25 P.M.

A survey of the foundations of leadership, of the factors which govern effective participation in group activities, and of the relationship between the student and his university.

Psychology 144 *Personnel Psychology* (3)

Hidbard, Muel

Fall—TTu 7:15-8:30 P.M., 144B—Spring, section 144C.

The application of psychology to personnel work in education, business, industry, and government.

Psychology 146 *Problems in Human Relations* (3)

Muel

Fall—MW 11:15 A.M.—Spring, section 146C.

The application of psychological principles to understanding and improving personal and group relations. Emphasis will be upon individual and group studies drawn from the problems and social activities of contemporary and administrative organizations. Prerequisite: Psychology 1 or Psychology 143 (the student in the second semester).

SPECIAL METHODS COURSES \*

To be elected to the senior year after satisfactory preparation in the teaching skills courses by the students in the secondary school curriculum. Course requirements are listed in outline with credit requirements. Prerequisite of successful teaching are practical and social teaching content as listed in current and course of study is reviewed.

Education 136 *Teaching English* (2 to 4) Lumsden

Spring—M 7:10-9:10 P.M., field work (2 hours) as arranged.

Prerequisite\*—eighteen semester hours in English.

Education 138 *Teaching Social Studies* (2 to 4) Root

Spring—W 7:10-9:10 P.M., field work (2 hours) as arranged.

Prerequisite\*—twenty-four semester hours of social studies.

Education 140 *Teaching Mathematics* (1) —————

Spring—T 1:10-3 P.M.

Prerequisite\*—Mathematics through calculus.

Education 144 *Teaching Science* (2 to 4) Rumbough

Spring—Th 5:10-7 P.M., field work (2 hours) as arranged.

Prerequisite\*—twenty-four to thirty semester hours of science.

Education 146 *Teaching Foreign Language* (2 to 4)

Spring—T 5:10-7 P.M.

Prerequisite\*—eighteen semester hours of the foreign language.

Education 148 *Teaching Home Economics* (2) Kirkpatrick

Spring—As arranged.

Prerequisite\*—thirty semester hours of Home Economics.

Education 152 *Teaching Business Subjects* (2) Short

Spring—As arranged.

Prerequisite\*—thirty semester hours of business education.

Speech 175-76 *Speech Correction* (3-5) Pettit

Autumn term—TTh 7:10-8:30 P.M.

A study of the nature of the disorders of speech with emphasis on treatment in diagnosis and treatment of children's speech. Admission to students of the program.

\* Prerequisite for all special methods courses. Education courses 141-143 and 151. Additional prerequisites are stated under each course.



## THIRD GROUP\*

Education 205-6 *The Curriculum*† (3-3)

Bish

Academic year—S 11:17 A.M.—4 P.M.

For experienced teachers. *First half:* curriculum foundations and basic foundations of curriculum content. *Second half:* principles and procedures in curriculum development; group consideration of student activities.

Education 207 *Curriculum Materials*† (3)

Bish

Summer 1957

For experienced teachers. Construction of courses of study, resource units, classroom materials, aids and illustrative materials; direct application to students' own situations.

Education 209 *Child Growth and Development* (3)

LaBue

Fall—M 7:10-9 P.M.

An interdisciplinary approach to child development taking into account such factors as heredity and culture, socialization, and socialization agents with particular emphasis on the home and school.

Education 210 *Adolescent Growth and Development* (3)

LaBue

Spring—M 7:10-9 P.M.

A consideration of physical, intellectual, and cultural backgrounds of adolescence with particular emphasis on social development, adjustment to personality, society, educational development and adjustment to school, and home relationships.

Education 212 *Evaluation in Education*† (3)

McCauley

Spring—Th 7:35-9:35 P.M., Summer 1957

Consideration of evaluation, relationship between evaluation of ends and means, some methods in the evaluation of learning situations. As the course progresses each student develops individual evaluation problems related to his work situation.

Education 213-14 *History of Education* (3-3)

Jarman

Academic year—T 7:35-9:35 P.M.

*First half:* the background backgrounds of American education. *Second half:* the evolution of the American school system.

\* A degree from an accredited institution is prerequisite to all third group courses.  
† Prerequisite: adequate professional preparation.

Education 215 *Education of the Exceptional*\* (3)

LaBue

Not offered 1957-58

For classroom teachers. A survey of current problems in the education and guidance of exceptional pupils. Nature and needs of those physically, mentally, or emotionally handicapped; needs of the gifted. Remedies for help in correction, diagnosis, therapy, education, and guidance.

Education 216 *Education of the Slow-Learner*\* (3)

Indorf

Summer 1957.

Identification, nature, and needs of the slow learner at the elementary and junior high school levels. Instruction upon individual development designed for teacher classroom teachers who must provide actual practice and guidance in the education and guidance of the slow learner. Also of interest to special-class teachers and administrators.

Education 217-18 *Contemporary Problems in Education*\* (5-3)

Jarman

Academic year—M 7 to 9 A. P. M., summer 1957—Education 217 (3).

*First half:* designed to help students formulate a personal philosophy of education. *Second half:* social foundations of education—a study of the forces that shape the policies and behaviors of the school.

Education 219 *Elementary School Classroom Procedures*\* (3)

LaBue

Summer 1957.

Current classroom practices with particular emphasis on ways of planning, and teaching techniques in discipline, individual and group cooperation, motivation, resources for learning, providing for individual differences.

Education 220 *Intermediate-Grade Education*\* (3)

Not offered 1957-58.

A study of the curriculum and methods of teaching in the intermediate grades, based upon a growing understanding of the child and his environment.

Education 221-22 *Early Childhood Education*\* (3-3)

Not offered 1957-58.

For experimental teachers. *First half:* nursery school and kindergarten education. *Second half:* education in the primary grades.

\* Prerequisite: adequate professional preparation.

Psychology 221 Seminar: *Psychology of the Handicapped: Dynamics of Adjustment* (3)

Spring—evening

The dynamics of adjustment and criteria of adjustment in general; the specific problems of adjustment in the handicapped.

Education 223-24 *Reading Problems\** (3-5)

Coleman

Audio-tape—W 7:10-11:10 AM

For experienced teachers. A critical approach to reading difficulties in elementary and secondary school levels. Illustrations and discussion of both typical and atypical cases.

Education 225 *Elementary School Reading* (3)

Coleman

Summer 1957

Developmental and personal approaches to reading problems. Study of reactions of children and teachers to reading and to the Reading Clinic.

Psychology 225 Seminar: *Mental Hygiene* (3)

Caldwell

Fri—Tue 10-8 PM—Summer 1957

A study of mental health problems with special attention to problems of prevention.

Psychology 226 Seminar: *Clinical Psychology of Childhood* (3)

R. Johnson

Spring—evening

A survey of children's behavior and personality disorders.

Education 227 *Basic Issues in Elementary Education* (3)

LaBue

Fall—S 9:10-11:10 AM

A consideration of basic issues in the purpose, organization, and content of elementary education. Emphasis on the theoretical and philosophical points of fundamental assumptions as they relate to classroom practice.

Psychology 227 Seminar: *Counseling and Guidance* (3)

Dreese

Spring—evening—Summer 1957

Recent developments and current problems in vocational, educational, and personal guidance in various types of agencies with particular reference to diagnosis. Psychological, educational, or professional components and Psychology. Two in the curriculum.

\* Prerequisite: advanced professional preparation.



Education 228 *Instructional Areas in Elementary Education* (3)

LaBue

Spring—S 9:15-11:15 A.M.

Critical appraisal of the theories, organization, learning and experiences, and teaching methods in the six broad areas of instruction in the elementary school.

Psychology 228 *Seminar: Techniques of Counseling* (3)

Dreese

Spring—Continuing

Studies types of vocational, educational, and personal counseling problems encountered through the case method. Presentation, trend, symptoms (causes), counseling and guidance and seminars with individual material methods.

Education 229 *Administration of Elementary Education* (3)

LaBue

Fall—W 7:15-9:15 A.M.; Summer 1937 (Mechanistic)

For experienced teachers and administrators. Administration as a means of achieving maximum efficiency, improved learning and teaching activities, building morale and spirit, maintaining the building and interesting school and community life. Emphasis upon study cases to action.

Psychology 229 *Seminar: Occupational and Educational Information* (3)

Faith

Spring—continuing

Designed to increase vocational and educational knowledge with the basic occupational and educational information necessary to conduct the business of data and technique of collecting, analyzing, and interpreting for purposes of guidance.

Education 231 *Secondary School Classroom Procedures\** (3)

Bills

Fall—Th 7:35-9:35 P.M.; Summer 1937

Survey of current classroom practices with particular attention to current trends such as teacher-student planning, group processes, group unity, initiative and stimulating activities (individual) and group evaluation techniques, building with etc. review of recent literature.

Psychology 231 *Test Construction* (3)

Hunt

Fall—continuing

The processes including the construction, individual treatment in the construction, evaluation, and administration of psychological, educational, and vocational tests. Emphasis on source of tests and interpretation and a source in statistics.

\* Prerequisite: advance professional experience.

- Psychology 232 *Research: Test Construction* (3) Hunt  
Fall—as arranged; spring—as arranged.  
Individual projects in construction and evaluation of psychological, educational, or vocational tests. Prerequisite: Psychology 231 and permission of the instructor.
- Education 233 *Audio-visual Education\** (3) J. Johnson  
Spring—T 6:15-9:00 P.M.  
Role of audio-visual materials in learning; selection, evaluation, and use of materials. Administrative problems in the care, operation, maintenance and use of audio-visual materials and equipment. Material fee, \$7.
- Psychology 235 *Individual Psychological Testing* E. Johnson  
(3)  
Fall—F 4:15-6 P.M.; spring—afternoon.  
Instruction and practice in giving of the Binet Test and the Wechsler-Bellevue Test. Prerequisite: an elementary course in tests and measurements. Material fee, \$7.
- Psychology 236 *Seminar: Analysis of the Individual for Purposes of Counseling* (3) Faith  
Fall—M 8:15-10:00 P.M.  
A detailed study of individual analysis techniques with practice in handling such methods. Prerequisite: an introductory course in educational or psychological measurements.
- Education 239 *Teaching the Core Curriculum\** (3) Bish  
Not offered 1957-58.  
An examination and study of classroom teaching procedures appropriate to the core program.
- Education 241 *Education of the Gifted\** (3) Indorf  
Summer 1957.  
For classroom teachers. Nature and discovery of giftedness; provisions for the gifted in regular classes; experimental projects.
- Education 243 *Human Relations in the Classroom\** (3) Marinaccio  
Summer 1957.  
Principles and practices involved in interpersonal relationships between learner and teacher and among learners.

\* Prerequisite: adequate professional preparation.

Education 245 *School and Community*\* (3)

Angel

Not offered 1957-58

The school as an important member of a team of social agencies that builds the community.

Education 251 *Guidance in Secondary Schools*\* (3)

Brougher

Fall—M 7 15-9 15 P.M.; summer 1957.

Scope, needs, organization of the program; services to students, the instructional staff, and the administration; personnel needed for the program.

Education 254 *The Junior High School*\* (3)

Bish, Root

Not offered 1957-58

Purposes, organization, core programs, guidance, developing course of study, extra-classroom activities.

Education 255-56 *Secondary Education*\* (3-3)

Root

Academic year—T 7 15-9 15 P.M.; summer 1957.

*First half:* current proposals for the improvement of secondary education. *Second half:* current problems in each of the subject-matter fields.

Education 259-60 *Secondary School Management*\* (3-3)

H. Johnson

Academic year—W 8 15-10 15 P.M.

For experienced teachers and administrators with two years of experience for teaching in secondary schools. Management planning, execution, and control; criteria of good management; construction of the master schedule; leadership problems incident to the development of new policies and programs.

Education 263-64 *Employee Training* (3-3)

Root

Academic year—Th 7 15-9 15 P.M.

*First half:* nature and purposes, organization and administration of programs; orientation, executive supervision, appraisals, critical teacher appraisal; public and political coordination with other management functions. *Second half:* current practices, operating policies and procedures of current organizations. Prerequisite: adequate professional preparation or two years of experience in employee training.

Education 265-66 *Teaching Secondary School English* (3-3)

Academic year—evening, W 7 15-9 15 P.M.

A selected course for teachers of English. Discussion of new approaches to high school students. Offered in cooperation with the de-

\* Prerequisite: adequate professional preparation.



departments of English and Speech. First half: communication of the structural linguistics, semantics, and speech. Second half: American and English literature.

Education 270 *Art Education* (3)

Nelson

Spring—Th 6:15-9 P.M.

For experienced teachers. Basic philosophy of modern art education, use of visual and tactile media, emphasis upon visual arts, poetry, and use of community resources. Designed to increase awareness of the structure process. Prerequisite: Education 10. Material fee \$4.00.

Education 271 *The Teacher and School Administration\** (3)

Fox

Fall—S 9:15-11:30 A.M.

A survey course for teachers and prospective administrators. Includes and school affairs, national economy, role of the state, local administration, school finance, legal issues, school plant, public relations, administrative functions, improved teaching.

Education 272 *The Teacher and School Supervision\** (3)

Fox

Spring—S 9:15-11:10 A.M., session 1977.

Needs, organization, human relationships, and techniques.

Education 273-74 *Teacher Education\** (3-3)

Academic year—F 7:15-9:30 P.M.

First half: aims, objectives, and basic issues, study of psychological and environmental processes. Second half: curriculum and content, professional education, teaching, and preparation professional education, study curriculum.

Education 275 Seminar: *Public Relations in School Administration\** (1)

Rice

Fall—W 7:15-9:30 A.M.

Peppercorn, authority, consensus, communicating agencies, public relations, public participation in policy making.

Education 276 *School Law\** (3)

Rosenblatt

Fall—Th 7:15-9:30 A.M.

Issues and cases of school law, legal rights and responsibilities of teachers, pupils, and parents. Other half: problems of administration in the public.

\* Prerequisite: degree or related experience.

Education 279-82 *Adult Education\** (1-3) Detwiler

Academic year—T 7:30-9:15 P.M.; summer 1937—Education 279 (3)

First half: current content and objectives, various methods, procedures on all levels—instructional through community. Second half: the adult as a learner, the teacher in adult, learning-teaching activities, administration of adult education program.

Education 281 *Group Procedures in Education\** (3) Detwiler

Summer 1937.

Theory, practice, evaluation, and application to all educational levels.

Education 285 *Extracurricular Activities\** (3) Rice

Not offered 1937-38.

Nature and purpose of playing activities—fundamental, club, competitive, school publication, student council, intercollegiate contests, and social activities in connection with problems, leisure, and evaluation.

Education 287-88 *Clinical Study of Reading Problem\** (3-3) Coleman

Academic year—S 11:15 A.M.-1:00 P.M.

For advanced students. Diagnosis and correction work done in the Reading Clinic. Each student is required to diagnose and treat pupils who are retarded in reading. Case studies are prepared and discussed. Education 287, seminar for 30. Performance Education 288-89 in the experiment.

Education 289-90 *Supervisory Problems in Reading\** Coleman (3-3)

Not offered 1937-38.

For experienced teachers, principals, supervisors, and superintendents. Considering the problems involved in supervising, diagnosing, and improving the reading program in primary, intermediate, and high schools in the part of the staff toward learning-teaching objectives.

Education 291 *Planning the School Plant* (1) Horton

Spring—Th 7:30-9:15 P.M.

Selection of sites; evaluation of existing facilities; selection of present facilities; objectives in constructing school buildings, renovation, and maintenance problems.

Education 293-94 *Research* (3-3) The Staff

Academic year—all situations.

Invitation through union the questions of a number of the staff. Program and curriculum arranged with the students.

\* For information, see the following pages.

Education 295 *Educational Research Methods and Procedures* (3)

Fox

Fall—T 5:30-7:30 P.M.; spring—F 7:15-9:15 P.M.; summer 1957

Required of all Master of Arts candidates following Plan 2. Knowledge of elementary statistics required.

Education 297 *Reading in Education*

The Staff

Fall—W 5:15-6 P.M.; spring—W 5:15-6 P.M.; summer 1957

To assist those preparing for the comprehensive examination. No credit toward degree requirements. Tuition fee, \$15.00.

Education 299-300 *Thesis* (3-3)

The Staff

Academic year—as arranged.

Required of all Master of Arts candidates following Plan 1.

DEPARTMENTS OF PHYSICAL EDUCATION

The following courses are offered by the Department of Physical Education for Men and the Department of Physical Education for Women. Whenever possible the departments offer lecture courses jointly.

FIRST GROUP

43-44 *Techniques of Physical Education: Motor Activities* (2-2)

The Staff

Academic year—section A (women), to be arranged; section B (men), TTh 10:30-12 A.M.

Fundamental skills, rules, and organization. Locker and towel fee.\* \$4.00 a semester.

45-46 *Methods and Materials for Teaching Individual and Dual Sports in Secondary Schools* (2-2) (men)

Hanken, Krupa

Fall—TTh 1:15-3:15 A.M.; spring—TTh 1:15-3 P.M.

Tennis, golf, swimming, wrestling, basketball, bowling. Locker and towel fee.\* \$4.00 a semester.

47 *Introduction to Physical Education* (1)

Myers

Fall—TTh 8:15 A.M.

An introductory course presenting the problems of physical education, vocational analysis, scientific foundations, and scope of field.

\* The locker and towel fee is required for participation in any of the activities.



- 48 *Introduction to Recreation* (2) Hanken  
Spring—TTh 8:15-9:45 A.M.  
The role of recreation in modern living, current practices in community recreation work, standards of training, experience, and salary, types of leadership.
- 49 *Human Anatomy* (3) Stallings  
Fall—MWF 9:15-10 A.M.  
The structure of the human body. Basic course for physical education majors. Also open to both men and women not majoring in Physical Education. Prerequisite: Biology 1-2 or Zoology 1-2.
- 50 *Kinesiology* (3) Lawrence  
Spring—MWF 9:15-10 A.M.  
A study of the anatomical functioning of movement; analysis of the action of muscles in physical education activities. Prerequisite: an approved course in anatomy.
- 51-52 *Methods and Materials for Teaching Physical Education Activities in Secondary Schools and Colleges* (2-2) (women) The Staff  
1957-58 and alternate years—academic year—as arranged.  
Team sports: basketball, hockey, football, soccer, softball, volleyball, individual and dual sports: badminton, tennis, golf, archery, canoeing, swimming, and diving; life saving and water safety, synchronized swimming. Group gymnastics. Trampoline. Locker and towel fee.\* \$4.50 a semester.
- 58 *First Aid and Care of Athletic Injuries* (2) DeAngelis, Lawrence  
Spring—TTh 8:15-10 A.M.  
Prevention and emergency care of injuries of all types, with special reference to first aid, civil defense, bandaging, and massage. A practical course. Prerequisite: Biology 1-2 or Zoology 1-2.

## SECOND GROUP

- 101 *Physical Education in the Elementary School* (3) Atwell, Burtner  
Fall—section A—F 1:15-2 P.M., laboratory—F 2:10-4 P.M.; section B—T 6:15 P.M., laboratory—T 7-8 P.M.  
Physical growth and development of the child and adolescent. Survey of age characteristics and organization of physical education activities for the various age levels in elementary school, playground, and settlement house programs. Methods and materials of dancing, games, dance, and self-testing activities.

\* The locker and towel fee is required for registration in one or more of the activity courses.

- 103 *History and Principles of Physical Education* (3) Atwell, Krupa  
Fall—MWF 11:11 A.M.  
Survey of history as it relates to contemporary physical education.  
Study of aims, objectives, and philosophy of physical education.
- 105-6 *Corrective Physical Education and Physical Examinations* (3-3) Lawrence  
Academic year—MWF 10:11 A.M.  
Cause and correction of faulty body mechanics. Physical examination methods for the diagnosis of postural defects, prescription of exercises and program adaptation. Prerequisite: Physical Education 99 and 100.
- 107 *Techniques of Teaching Recreational Dance* (1)  
Fall—TTh 9:11 A.M.  
Methods and materials for teaching the country and social dances of America and the folk dances of other countries to secondary school age and adult groups. Spoken word rating is included. Locker and towel fee.\* \$4.50.
- 109-10 *Leadership Organization in the Intramural Program* (2-2) DeAngelis  
Academic year—W 1:13 P.M., laboratory—as arranged.  
Principles of administration, organization, and supervision of intramural activities in the physical education program of the junior high school, senior high school, and college.
- 111-12 *Methods and Materials for Teaching Physical Education Activities in Secondary Schools and Colleges* (1 to 2-1 to 2) (women) The Staff  
1948-50 and alternate years  
Coordination of methods and materials in activities based upon Physical Education 51-62. Locker and towel fee.\* \$4.50 a semester.
- 113-14 *Methods and Practice in Teaching Physical Education Activities* (2 to 4-2 to 4) Flanken and Staff  
Academic year: section A (women)—as arranged; section B (men)—evening, M 7:10 P.M., laboratory, as arranged.  
Principles and methods applied to teaching and teaching physical education activities in college and secondary schools. Prerequisite: Physical Education 51-62. Locker and towel fee.\* \$4.50 a semester.

\* The locker and towel fee is assessed for students in order to insure the proper use of the physical education facilities.

- 115.46 *Methods and Materials for Teaching Team Sports in Secondary Schools* (2 to 4-2 to 4) (unit)  
 DeAngelis, Hanken  
 Fall-TTh 10 to 11 A.M.; spring-MW 11 to 11 A.M.  
 Football, basketball, baseball, track and field. Locker and towel fee.\* \$4.50 a semester.
- 117 *Methods of Teaching Modern Dance* (1 to 2) Bostner  
 1948-49 and alternate years.  
 Emphasis on the teaching of movement as a medium of expression. Practical study in body technique, composition, and the analysis of compositions for dance including dramatics, story, and plot scenes. Application is made to both elementary school and adult audiences. Locker and towel fee.\* \$4.50.
- 118 *Dance Productions* (1 to 2) Bostner  
 1948-49 and alternate years.  
 Choreography for dance, musicals, operas, and plays. The planning and staging of dance for TV, stage, community, and school settings. Locker and towel fee.\* \$4.50.
- 121 *School and Community Health Programs* (3) Krupa  
 Fall-MW 11:45 to 1 P.M.  
 Health activities, healthful environment, health instruction, sources of material for general health knowledge. Prerequisite: Biology 1-2 or Zoology 1-2.
- 122 *Methods and Materials for Health Education* (3) Atwell  
 Spring-Th 7:30-9:15 A.M.  
 Organization and presentation of health materials for each age level. Prerequisite: Biology 1-2 or Zoology 1-2.
- 131 *Tests and Measurements in Physical Education* (3) Krupa  
 Fall-MWF 9 to 10 A.M.  
 Critical review of tests in physical education, presents all test situations, elementary statistics.
- 132 *Camp Leadership* (1) Atwell, Stallings  
 Summer-Tuesdays  
 Serving camps in camp counseling.

\*The locker and towel fee is required for participants in one or more of the physical activities.



- 133-34 *Observation and Student Teaching* Atwell, Myers  
(2-3 to 6)  
First half, fall and spring—as arranged. Second half, fall and spring—as arranged.  
Assignments are made to schools in Washington and the vicinity.  
Physical Education 184, student teaching fee, \$8.
- 135 *Survey of Dance History and Dance Forms* (3) Burnett  
Spring—course.  
The development of dance from primitive ritual to present day theatrical and art form of the dance. Includes analytical dance practice and discussion of fundamental movement technique and composition.
- 138 *Organization and Administration of Physical Education* (3) Atwell, Myers  
Spring—17:15 to 1:45.  
Organization and administration of physical education programs in elementary and secondary schools and in colleges. Study of plans, fields, equipment, and programs.
- 151-52 *Recreational Leadership Activities* Christiansen  
(1 to 4-1 to 3)  
151-52 and alternate years: quarterly course—W 7:35-9:15 P.M.  
Fall semester: basic skills for the recreation field including: AED, first aid, safety, station in safety, music, dramatics, physical and social activities. Spring semester: basic skills for the manager and leader. Arts and crafts, dramatics, physical and social activities.
- 161 *Community Organization for Recreation* (3) Anderson  
Falling and alternate years.  
Reasons, possibilities, and methods in planning community recreation centers.
- 162 *Administration of Community Recreation Programs* (3) Anderson  
1598-59 and alternate years.  
Plans and policies in administering recreation including program organization, program area, facilities, equipment, finance, and evaluation.







THE GEORGE WASHINGTON UNIVERSITY  
WASHINGTON, D. C.

Report of the Treasurer

FOR THE YEAR ENDED

AUGUST 31, 1957



# EXHIBITS

- A. Balance Sheet
- B. Summary of Current Income and Expenses
- C. Summary of Salaries
- D. Notes to Financial Statements
- E. Summary of Investments, Restricted Funds
- F. Summary of Long Term Principal
- G. Summary of Investment Funds Programs
- H. Summary of Plant Funds Programs
- I. Summary of Non Investment in Plant

# SCHEDULES

- 1. Current Income
- 2. Current Expenses
- 3. Investments of Current Funds
- 4. Activity of Long Funds
- 5. Summary of Investment Funds
- 6. Investment Funds Held in Trust by Others
- 7. Summary of Plant Funds
- 8. Land and Buildings
- 9. Equipment
- 10. Retirement Current Funds—Organized Retirement
- 10A. " " " Investment Insurance
- 10B. " " " Miscellaneous
- 10C. " " " Agency
- 11. Changes in Principal of Long Funds
- 12. Changes in Principal of Investment Funds
- 13. Changes in Principal of Plant Funds

# APPENDIX

- Gifts and Grants
- Description of Loan Funds
- Description of Investment Funds
- Description of Plant Funds

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## LETTER OF TRANSMITTAL

December 6, 1957

To the President and the Board of Trustees  
The George Washington University  
Washington, D. C.

### GENTLEMEN:

I am submitting herewith the Report of the Treasurer of The George Washington University for the fiscal year ended August 31, 1957. This report is a review of the budget operations for the year and is based on the budget approved by the Board of Trustees of the University.

The summary of the University's income and its financial results are presented in comparative form with the previous year's figures of the Summary Statement of Standard Receipts for Institutions of Higher Education. Under this plan the Board of the University are enabled to compare the University's financial results with the average of the financial results of other institutions of higher education.

The Statement of the University's income and its financial results for the year 1957 and this report is submitted herewith.

A detailed summary of the financial results of the University for the year is presented below and an accounting report is attached by detailed Exhibits and Schedule.

Respectfully submitted,  
HENRY W. HICKMAN,  
Treasurer

# CONDENSED SUMMARY

## CURRENT FUNDS

These Funds represent funds made available for expenditure in the current operations of the University.

Current Income for the Year (Exhibit B and Schedule A)	13,753,234.43
Current Payment for the Year (Exhibit B and Schedule A)	13,753,664.34
Balance of Current Income over Current Payment (Exhibit B)	467,000.70

The above amount was added to Current Funds Surplus. Surplus at the end of the year amounted to \$1,090,744.20 (Exhibit C). Income for 1937-38 was transferred from Surplus to Non-Expendable Funds. Surplus at the end of the year amounted to \$1,090,744.20 (Exhibit C). The balance of the year was transferred to the University and \$1,090,744.20 to the Hospital. Of the total period

ended, the year 1937-38 included \$1,090,744.20 to the University and \$1,090,744.20 to the Hospital. Of the total period

ended, the year 1937-38 included \$1,090,744.20 to the University and \$1,090,744.20 to the Hospital. Of the total period

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ended, the year 1937-38 included \$1,090,744.20 to the University and \$1,090,744.20 to the Hospital. Of the total period

## LOAN FUNDS

For the assistance of students seeking financial aid, loan funds have been established by the University and other organizations (Schedule 4). Loans are made at a low rate of interest and when repaid the interest is added to the principal of the funds. During the year \$114,110.00 was received to establish the Home School of Medicine Loan Fund.

During the year, 482 loans were made to students. Loans loans totaled \$61,200.02.

## INDEWMENT FUNDS

The principal of endowment funds amounted to \$6,017,106.77 (Schedule 5). An increase of \$3,576,198.12. This increase is accounted for in large part by grant from the Ford Foundation of \$2,500,000.00. The income from \$2,000,000.00 is to be used for the School of Medicine, and the income from \$500,000.00 is to be used for faculty salaries. \$100,000.00 are reserved, the income of which is to be used for Hospital purposes. The endowment funds are represented by shares which, under the terms of wills, funded gifts, or other gifts, are to be used for the University, must be held in perpetuity for the income producing purposes. The principal amount and interest during the year are recorded in Schedule 12.

"Consolidated Endowment Funds" amounted to 144 endowments with a total value of \$3,400,711.00 (Schedule 5). The assets of these funds are controlled by trustees for the purpose of partial or total loss of any fund through the failure of a specific investment, and to avoid temporary suspension of income and the giving of unexpected small cash incomes, with the possibility of investment in all funds. Under the above conditions for the funds, the assets of all endowments are added to the assets of the Consolidated Endowment Funds.



Present for Paragraph 6 Instruments were as follows: Canceled Investment Bonds, \$100,117.74; Savings Plan Bonds, \$2,766.80 (Schedule 1A).

Various of Canceled Investment Bonds are retained by our customer account and at the end of the year are transferred to the authorized bonds using the method of valuation of cancellation. This report retains the investment of these bonds amounting to \$11,117.74 at the end of the past year.

The Current Plan Investment Bond account is being maintained as its present point during the past year ended.

Some income from all investments for the year was \$113,239.12 (Schedule 10A—Page 1).

Plotted to the closed of Medicare Investment Fund on August 31, 1977, entitled \$250,000.00.

#### PLAN 1 FUNDS UNEXPENDED

Cash and other assets for development of the physical plant comprise these funds (Schedule 7). At year-end had one year the balance was \$489,403.90 (Schedule 6).



# REPORT OF INDEPENDENT AUDITORS

December 6, 1957

TO THE PRESIDENT AND THE BOARD OF TRUSTEES  
THE GEORGE WASHINGTON UNIVERSITY  
WASHINGTON, D. C.

We have examined the accompanying balance sheet of The George Washington University as of August 31, 1957, and the statement of current income and expense, accuracy of current fund raising and the related assets and liabilities of other funds (Exhibit A through H) for the year then ended.

Our examination was not in accordance with generally accepted auditing standards, included such type of examination of current income and expense procedures as we considered desirable. Plans, policies, procedures, and related assets and liabilities of other funds, and related income and expense, were not audited by direct correspondence, however, except for a summary of \$152,000 received from the University as of that type referred to each contribution by means of other auditing procedures.

The University is negotiating with representatives of the United States Government to obtain a settlement for cash received by the University in the conduct of certain research projects undertaken on behalf of various United States military departments. Pending the completion of such negotiations the collection of a total of \$972,864 included in the University's August 31, 1957, balance sheet is receivable from the Government and the total disbursement of \$146,000 collected from the Government as of that type cannot be determined.

In our opinion, subject to the comments in the preceding paragraph, the accompanying financial statements (Exhibit A through H) and related assets present fairly the financial position of The George Washington University as of August 31, 1957, and the results of its operations for the year then ended, in conformity with generally accepted principles of accounting applied on a basis consistent with that of the preceding year.

PRICE WATERHOUSE & CO.



THE GEORGE WASHINGTON UNIVERSITY  
BALANCE SHEET

August 31, 1957

ASSETS

CURRENT FUNDS

Cash	824,876.37
Investments (Note 2) (Schedule 1) (market value \$561,118.00)	575,352.50
Accounts Receivable (Schedule 1)	35,422.00
Notes Payable (Schedule 1)	94,989.50
New Buildings (Schedule 1)	929,354.21
Accounts Payable (Schedule 1) - Construction - Cost Realization, Research, Contracts	438,873.51
Prepaid Expenses (Schedule 1) - Hospital, net of allowance of \$73,000 for doubtful accounts	44,168.78
	1,427,896.50

Prepaid Expenses (Schedule 1)	267,210.00
	51,527.92
	318,737.92

3,256,774.79

LOAN FUNDS

Cash	50,962.82
Loans Receivable (Schedule 1)	50,314.10

61,296.92

ENDOWMENT FUNDS

Cash	21,204.17
Investments (Note 2) (Schedule 1)	6,303,456.20
Stocks and Bonds (market value \$7,812,095.00)	196,047.00
Real Estate	42,863.79
Other Investments	593,570.01
Facilities Held in Trust by Others (Schedule 1)	6,957,120.77

6,957,120.77

PLANT FUNDS

Unexpended Cash	80,247.40
Marketable Securities (Note 2) (market value \$399,000.00) (Schedule 7)	400,156.30
Invested in Plant - Land and Buildings (Note 2) (Schedule 8)	20,167,264.19
Equipment (Note 2) (Schedule 9)	1,425,000.76
	22,500,554.95

489,403.90

38,355,551.33

TOTAL ASSETS

# LIABILITIES, FUNDS, SURPLUS

## CURRENT FUNDS

Liabilities—Note Payable, 4 1/2%, date 1 August 30, 1957, repaid September 3, 1957	400,000.00	
+	341,653.23	
Assets Payable		766,244.55
+	24,501.32	
Deferred Income	108,808.66	
Designated Funds (Note 1) (Exhibit D)—Investment Income	1,285,179.54	
+	9,737.84	
Gifts and Grants		1,398,786.04
+		1,091,744.20
Agency		8,256,774.79
Surplus (Exhibit C)		61,296.92

## LOAN FUNDS—Balances (Exhibit E)

6,957,120.77

## ENDOWMENT FUNDS—Balances (Exhibit F)

489,403.90

## PLANT FUNDS—Unexpended Balances (Note 4) (Exhibit G)

## INVESTED IN PLANT

Note Payable, 4 1/2%, Jan. 1, 1954 (Note 6)	450,000.00	
+	1,088,554.74	
Trust Notes Payable (Notes 4 and 6)		1,538,554.74
+		21,051,400.21
Net Investment in Plant (Exhibit H)		22,590,954.95

## TOTAL

33,355,551.53

Exhibit A

# SUMMARY OF CURRENT INCOME AND EXPENSE

For the Year Ended August 31, 1957

Income (Schedule A)		
Educational and General		
Student Fees	2,003,910.04	
Endowment and Third Party Income—Portion used	243,050.43	
Gifts—Portion used	239,716.76	
Student Activities	106,507.13	
Student Services	108,119.70	
Student Government		
Organized Home-quests and all communications under Special		
Committee	1,007,006.32	
Hospital	3,777,008.49	
Student Transportation		
	<u>13,387,041.36</u>	13,387,041.36
Expense (Schedule B)		
Educational and General		
Administrative and House-		
holdings	3,146,465.00	
Library	2,061,000.87	
Student Services	308,306.43	
Student Government	225,041.17	
Student Activities	114,802.75	
Organized Home-	1,805,006.32	
quests	4,400,974.13	
Hospital	3,010,300.42	
Student Transportation	29,471.07	
Other communications of Institute (included Library)		
Student Government		
Student Activities		
	<u>13,078,379.13</u>	
	49,709.23	
	<u>13,128,088.36</u>	
Excess or Deficiency (Income over or under Expense)		458,952.99

Excess or Deficiency (Income over or under Expense)



# SUMMARY OF CURRENT FUNDS SURPLUS

For the Year Ended August 31, 1957

	TOTAL	UNAPPORTIONED	APPROPRIATED FOR FUNDING
BALANCE AUGUST 31, 1956	1,370,579.48	612,208.17	748,701.11
APPROPRIATION (Disbursements)			
Excess of University Income over Current Expenses (Exhibit B)	467,500.70	(26,733.73)	239,633.97
Unapplied Depreciation (added to Current Expenses for which there was no supply of Current Funds (Schedule 2))	186,300.00	—	186,300.00
Transfer of New Investments to Prior report to cover of non-depreciated capital additional from Unrestricted Current Funds (Exhibit C)	(433,104.98)	(-817,276.01)	(-1,111,128.97)
Appropriation for Support of School of Medicine	—	113,128.18	(-113,128.18)
BALANCE AUGUST 31, 1957—EXHIBIT A	1,000,744.20	184,296.17	907,448.03

Exhibit C

THE GEORGE WASHINGTON UNIVERSITY  
STATEMENTS TO FEDERAL STATISTICS

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Notes

Experiments conducted by the University's Public Opinion Research Center are available at the following market value at the date of publication.

The estimate which is stated at each page is calculated as follows:

Land and buildings acquired between 1921 and 1940 were valued at approximately 100% of their book value as determined by the Washington Real Estate Board. Later in 1931, except for the National Railway Company, which was valued at one-half of its book value, all other companies were valued at 50% of their book value. In 1940 the Board valued land and buildings at 100% of their book value, except for National Railway, which was valued at 50% of its book value. A number of companies reported the historical value of their property at the time of acquisition, and others reported the value of their property at the time of acquisition.

# North

Unencumbered plant funds at August 31, 1957, are designated for the following uses:

General Building	231,219.00
Law Center Building	130,096.00
Library Building	101,568.00
Other	<u>26,521.20</u>
	489,407.20

# North

The encumbered amounts payable to the Plant Fund were as follows:

Fieldville Life Assurance Society Insured by National Home. Due \$2,575 each February 1, May 1, August 1, and November 1, including interest at 4%.	144,544.28
Student Health Co. Insured by Mutual Hall. Due May 28, 1958. Interest 3%.	415,000.00
Proprietor Publishing Association Insured by Mutual Hall. Due \$275 per month including interest at 4%.	79,010.46
Blue National Bank Insured by Mutual Hall. Due February 21, 1960. Interest 4%.	350,000.00
Insured by Commercial Hall and Bankers Hall. Due November 1, 1957. Interest 4%.	<u>100,000.00</u>
	1,068,554.74

# North

To provide permanent long term financing for two student residence halls acquired during the year ended August 31, 1957, and to provide for alterations to them, the University has applied for a long term loan of \$1,350,000.00 from the Housing and Home Finance Agency of the United States Government.



**SUMMARY OF DESIGNATED FUNDS**  
For the Year Ended August 31, 1957

	ORGANIZING DONATION (Schedule 10)	INVESTMENT EXPENSE (Schedule 10A)	MISCELLANEOUS EXPENSES (Schedule 10B)	ACTIVITY (Schedule 10C)
<b>Balance, August 31, 1956:</b>	<b>1,141,331.19</b>	<b>55,743.87</b>	<b>640,000.34</b>	<b>14,292.40</b>
<b>Amounts:</b>				
Gifts and grants	4,149,108.04	265,889.04	162,787.81	
Contributions income			10,000.88	
Dynasty			39,614.45	17,972.14
	<u>4,149,108.04</u>	<u>265,889.04</u>	<u>212,402.84</u>	<u>17,972.14</u>
<b>Disbursements:</b>	<b>8,807,600.12</b>			
Research expenditures		10,171.00	15,047.88	
Scholarship fundations		1,631.50	542.75	
Print				
Transferred to		123.12		
Self-insurance in Plant—Faculty Org.				
Country Income—Schedule 1		190,067.80	214,787.44	
Educational and General:		8,614.17		
Bursary		718.00		
Depressed Institute—Schedule 10			10.00	
International Agricultural Funds—Schedule 10B		30,000.88	18.00	
Farm Funds—Schedule 11		7,000.43	85.00	
Endowment Funds—Schedule 12		6,204.15	11,518.77	
Plant Funds—Schedule 13			410.50	42,429.70
Welfare			242,230.34	42,449.70
	<u>4,406,117.81</u>	<u>237,764.28</u>	<u>619,292.84</u>	<u>9,732.84</u>
<b>Balance, August 31, 1957—Exhibit A</b>	<b>1,386,769.34</b>	<b>103,808.66</b>		

# SUMMARY OF LOAN FUNDS PRINCIPAL

For the Year Ended August 31, 1957

46,147.22

Balance August 31, 1956

Subscriptions (Schedule 11)

Gifts

Interest on Loans

14,914.71

433.65

15,348.36

61,495.58

17

Deductions (Schedule 11)

Collected for U. S. Government

198.06

61,297.52

Balance August 31, 1957—Exhibit A

Exhibit E

THEORY OF EXPONENTIAL INTEGRAL PRINCIPAL.

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# SUMMARY OF PLANT FUNDS PRINCIPAL

For the Year Ended August 31, 1967

677,477 01

BALANCE AUGUST 31, 1966

AMOUNTS (Schedule 1)

Gifts

Expenditures

Net fund balance of investments

198,183.44

14,013.20

6,286.31

211,798.95

599,278.96

DEBITORS (Schedule 1)

Invested by Plant - Expend Co

Local fund balances

Expenses

Transferred to General Fund - Schedule 1

389,472.59

17,459.18

409,811.84

3,000.12

409,872.06

489,403.90

BALANCE AUGUST 31, 1967 - EXHIBIT A

Exhibit C

# SUMMARY OF NET INVESTMENT IN PLANT For the Year Ended August 31, 1957

Description	Current Period		Disposals During Period	Plant Form During Period	Less and Additions (Subtractions)	Total
	Disposals	Current				
	(Folio 1)	(Folio 2)	(Folio 3)	(Folio 4)	(Folio 5)	(Folio 6)
<b>Balance August 31, 1956</b>						19,757,356.41
<b>Acquisitions</b>						
Equipment		713,746.45		35,471.09		
Buildings		87,711.30	425.54	6,108.42		
Furniture		39,015.21				
Total Acquisitions		817,852.95	425.54	6,108.42		
<b>Disposals</b>						
Buildings		8,606.41		11,230.85		
Furniture		107,003.59		31,266.81		
Total Disposals		115,609.99		42,497.66		
<b>Net Investment</b>		702,242.95	425.54	408,610.76		
<b>Balance August 31, 1957</b>						20,460,000.00

## SCHEDULES



# CURRENT INCOME

For the Year Ended August 31, 1957

## EDUCATIONAL AND GENERAL

Support, Base	
Travel and Education	
Colleges	111,171.34
Universities	229,294.94
Education	144,000.25
Education	164,708.98
General Books	11,000.00
Education of Governmental Personnel	165,817.09
Government	65,100.00
For Farm, Navy and Management	117,000.00
Air Force Research Administration	14,000.00
French Labor Program	6,000.00
Navy Commission	26,904.08
Children's Fund	719,430.69
Trust	608,911.00
Life	118,411.00
Medical	70,800.00
Program	20,739.67
Special Interest	30,400.00
University Institute	
Support, General	
Unallocated - 1955 Year	
	3,410,497.81
	918,841.47
	<u>1,751,011.33</u>

Miscellaneous Expenses	40,286.00
Appointments	474.00
Academy	2000.00
Per Magazine	791.00
Building Plans	500.00
Books	3,070.00
Claims	5,350.50
Transportation	87,265.00
Equipment	2,480.00
Construction	1,030.00
Construction Plans and Permits	2,777.65
Lab.	2,600.00
Living Funds	1,355.00
Publication of Papers	6,120.00
Patent	440.00
Salaries	6,195.00
Special Investigations	17,857.00
Student Bar Association	4,525.08
Testing Center	
Transcripts	
	<u>172,813.23</u>
	3,863,036.56

# CURRENT INCOME (Continued)

For the Year Ended August 31, 1967

## EDUCATIONAL AND GENERAL (Continued)

### Investment Income (Schedule IDA)

Excess Investment Funds—Unrestricted

Restricted

Plant Funds—Restricted

46,895.15  
194,169.30

241,092.43  
4,888.00

245,980.43

### Gifts

Unrestricted (Appendix Page 1)

Restricted (Schedule IDB—partially audited)

35,117.18  
202,579.58

237,716.79

24

### Student Activities

Activities

College Expense

College Fund

Deans Office

Equipment Control

Hallways

Housing Fund

Student Bar Association

Student Council Activities

79,144.51  
102.00  
7,629.98  
2,188.75  
102.01  
9,842.95  
4,916.85  
188.11  
3,501.97

108,017.13



MISCELLANEOUS	
Handing from Veterans Administration	10,679.95
Account Payable	12,849.20
Law Review	6,589.75
Melbourne	5,717.97
Melbourne	9,124.29
Melbourne	22,653.60
Melbourne	31.50
Paying Inc. 1114 1 St. NW	29,500.88
Paying Queen's Credit Union	30,656.86
Paying Queen's	8,255.50
Paying Macdonald Properties Ltd	3,060.22
Sperry Chase	
Transfer from Law Center Fund (Schedule D) for extra party expenses	138,119.70
	3,865,696.52

Operating Restaurant (Schedule D - portion taxed)

CURRENT INCOME (Continued)  
For the Year Ended August 31, 1937

EDUCATIONAL AND GENERAL (Continued)

Hospital—Patients

Room Charges	574,637.00
Private	1,388,717.91
Semi-Private	287,514.00
Wards	143,652.00
Nurses	2,394,327.91

Special Service Departments

Operating Room	257,165.14
Delivery Room	123,452.25
Anesthesiology	107,545.00
Oxygen Therapy	48,934.11
X-Ray	258,424.52
Physical Medicine	78,177.95
Laboratory	515,273.29
Pharmacy	269,887.37
Catheter	37,520.78
Electrocardiography	8,692.28
Pathology Laboratory	5,260.00
Post-Anesthetic Room	24,782.35
Radiation Therapy	21,318.40
	1,986,232.41

Cancer Clinic	144,417.65	
General Surgery	3,050.05	
Gross	1,481.17	
Insurance, Insurance Schedule (H.A.)		149,041.34
Miscellaneous	90.44	

Over Payment Documents	73,881.34	
China	29,611.71	
Insurance	14.60	
Other Expenses	14,604.50	
Utilities	6,529.24	
Salary	181.00	
Donations	2,221.55	127,835.14
Expenses		

Other Income	171,364.41	
Interest and Dividend Income	3,191.00	
Special Data Notes	17,140.12	
Telephone		
	1m, 1m, 73	4,853,333.53 (Continued)



# CURRENT INCOME (Continued)

For the Year Ended August 31, 1962

## EDUCATIONAL AND GENERAL (Continued)

### HUMANITIES - PARTIAL (Continued):

Loan Allowance		
Group Hospitalization	29,546.01	
Hospital Service Agency	10,640.04	
D. C. Health Department	30,644.77	
Insurance	6,711.34	
Post Work	142,721.68	
Other	6,307.26	
	<u>376,470.07</u>	4,333,333.33

### Total - Humanities

4,376,862.86

### HUMANITIES - Other Income

Columbia	116,746.08	
Endowment Income (Excludes 100%)	8,131.00	
Other	8,929.80	
Total Other Income	15,366.37	
Leasehold	2,708.43	
Medical Storage	544.25	
Postage Book	600.00	
Publicity Campaign Committee	407.80	
Manuscripts	<u>2,637.33</u>	
	170,745.73	4,727,608.49



# CURRENT EXPENSE

For the Year Ended August 31, 1957

## EDUCATIONAL AND GENERAL

### ADMINISTRATIVE AND GENERAL

	Total	SALARIES	Other Expense	EQUIPMENT Transfer G.L.
President's Office	124,607.54	53,565.80	68,047.34	
Admission Office	6,427.26	61,821.18	4,796.78	
Student Information Bureau's Office	61,914.83	34,316.60	2,619.23	
Dean of Students' Office	531,433.33	234,444.04	96,726.29	
Thomas G. Office	67,178.87	62,317.13	4,840.72	
Admission Office	67,080.72	59,888.98	9,200.74	
Engineering Office	6,546.21	5,017.53	605.26	
Admission for Men	14,466.41	13,610.62	511.89	
Admission for Women	1,488.97	737.01	751.96	
Admission for Students from Foreign Countries	1,218.80	1,077.00	1,145.80	
University College	11,564.55	13,314.34	649.61	
Western Education	108,400.79	13,740.04	155,063.73	
Staff Housing	34,409.77	21,861.95	2,137.42	
Assistant to the President's Office	9,411.44	18,983.74	20,444.70	
Admission Office	9,076.34	18,206.18	2,390.46	
Education Office	6,574.46	4,297.56	1,576.83	
Food Bureau	42,477.12	23,480.53	19,026.61	
Public Relations	24,177.08	777.78	21,395.25	
Commodities	11,664.31	10,544.21	1,086.10	
Scientific Activities	43,687.44		43,687.44	
President's Office	5,731.88		5,731.88	
General Administration	6,524.63		6,524.63	
Legal Expense	2,430.00		2,470.00	
Current ed. exp.	21,178.63	17,220.00	3,958.63	
Transfer of exp.	1,991.00	1,942.35	1,431.65	
Transfer of exp.	1,136.00	1,042,306.24	1,431.65	
Carrying			1,431.65	



## INSTRUCTORS

## California College

## Administration

## Art

## Biological

## Business

## Chemistry

## Classical Languages and Literature

## Education

## English

## Geography

## History

## Languages

## Literature

## Mathematics

## Philosophy

## Physical Science

## Psychology

## Religion

## Romance Languages

## Social Sciences

## Slavic Languages

## Statistics

## Speech

## Zoology

4,336.98	3,848.30	488.68	
22,400.78	14,500.00	7,906.78	
10,046.10	15,470.00	261.40	314.70
10,246.72	8,184.96	292.86	1,759.40
88,134.12	80,032.33	6,748.03	463.76
5,519.92	3,499.92	20.00	
54,508.20	54,367.80	140.40	50.56
123,895.13	123,543.63	300.94	1,120.50
20,007.39	18,604.96	881.65	403.43
6,214.90	5,231.25	379.22	
17,828.80	17,760.00	38.80	
61,093.60	60,884.92	208.68	
11,360.01	11,277.50	112.51	
40,106.78	40,081.35	25.53	
10,833.72	10,801.25	32.47	1,074.36
54,536.16	52,635.81	823.99	
37,773.00	37,608.67	164.33	
48,144.19	44,573.71	478.01	92.47
17,162.01	17,089.92	72.09	
65,247.13	65,108.67	138.46	
8,059.01	7,200.00	308.01	551.00
8,899.03	5,875.00	24.03	
19,115.62	19,039.96	75.66	
40,047.29	38,389.65	1,355.60	352.04
23,203.28	20,087.50	2,721.18	394.60
807,411.37	776,956.96	23,721.09	6,377.82

# CURRENT EXPENSE (Continued)

For the Year Ended August 31, 1957

	Total	Salaries	Other Expense	Equipment Exhibit
<b>EDUCATIONAL AND GENERAL</b>				
<b>Instruction (Continued)</b>				
Education	9,456.77	8,660.04	696.73	276.30
Administration	40,236.53	30,428.88	811.18	198.05
Books	13,322.28	12,000.00	1,124.23	474.35
House Furnishings	53,217.88	80,118.92	2,622.31	
Experiments	15,872.44	11,980.92	3,941.52	3,172.15
Administration	51,255.16	47,261.83	1,221.18	3,807.21
City	37,595.35	32,545.50	1,042.64	2,330.61
Pharmacy	40,651.77	37,330.00	991.16	
Medical	38,375.64	37,049.92	1,325.72	
Programs and Administration	4,392.68	4,050.00	342.68	
Matter of Science Program	5,100.00	5,000.00		
Department of Research	2,158.51		2,158.51	
University Council	4,917.97		4,917.97	
Medical	45,767.44	6,053.82	5,832.17	33,881.45
Museum for Teachers Hall	24,186.36	181,221.96	21,773.55	43,191.42
General Studies	71,256.35	60,446.59	10,830.60	
Administration	109,824.87	109,824.87		400.20
Department	19,475.97	18,437.75	638.02	
Reading Center	7,866.65	5,201.20	2,665.39	
University of Connecticut Administration	208,443.74	193,910.47	14,133.07	400.20

# City of Chicago

Administration	9,314.90	8,500.26	748.64
Accounting	26,746.63	26,774.98	171.65
Business Administration	37,348.71	37,163.06	184.75
Public Administration	16,744.91	16,744.91	
Political Science	75.00	75.00	
Political Government and Municipalities (Internat.)	27,000.17	26,950.92	49.25
Sociology	20,088.89	17,223.97	2,864.92
Social Control	67,510.77	50,091.98	17,418.79
Survey Research Management	32,337.41	29,947.12	2,390.30
Urban Administration and Management	14,481.78	12,000.00	2,481.78
Public Affairs	1,443.12	1,443.12	
School of Community Study	254,300.29	223,884.22	30,416.07

## Graduate Council

Administration	6,630.56	4,371.48	2,259.08
Education	2,240.79	1,800.00	440.79
Political Science	8,471.32	5,671.48	2,800.84
Urban Administration	6,540.17	5,983.76	556.41

## Law

Administration	21,287.72	15,180.75	6,106.97
Education	159,815.00	156,833.00	2,982.00
Law Review	12,687.99	2,467.21	10,220.78
Political Science and Governmental Studies	71,431.91	53,118.02	18,313.89
Student Bar Association	2,871.18		2,871.18
	248,084.90	207,600.98	40,483.92



**CURRENT EXPENSE (Continued)**  
For the Year Ended August 31, 1957

	<u>TOTAL</u>	<u>SALARIES</u>	<u>OTHER EXPENSE</u>	<u>EQUIPMENT EXPENSE</u>
<b>EDUCATIONAL AND GENERAL (Continued)</b>				
<b>Institution (Continued)</b>				
Medicine	42,064.20	37,399.88	5,280.17	2,284.15
Administration	51,873.72	46,094.91	2,116.55	3,662.26
Anatomy	68,524.91	48,454.52	3,080.18	11,990.21
Bacteriology, Hygiene, and Preventive Medicine	45,516.38	40,450.50	1,880.91	3,184.97
Biochemistry	1,325.00	1,325.00		
Dermatology, Syphilology	60,689.28	59,491.18	802.40	395.70
Medicine	7,497.90	6,835.32	664.58	
Neurology, Neurological Surgery	31,530.84	30,999.84	400.00	
Oncology, Gynecology	1,325.00	1,325.00	130.00	
Ophthalmology	1,680.00	1,450.00	1,281.45	398.98
Otolaryngology	31,556.33	29,875.90	39.65	
Pathology	18,199.57	18,169.92		
Pediatrics	31,524.52	29,419.92	1,231.28	873.32
Pharmacology	3,399.96	3,099.96		300.00
Physical Medicine and Rehabilitation	49,528.75	42,281.52	2,245.12	5,002.11
Physiology	9,639.03	9,619.83	19.25	
Physiology	44,335.80	38,022.17	6,272.03	41.60
Surgery	1,517.50	1,475.00	42.50	
University	(-122.93)		(-122.93)	
Post Graduate Medical Education	18,688.23	6,480.91	7,400.74	4,806.58
Research - General	5,923.15	5,599.92	65.92	257.31
Training Aids	330.00	830.00		
Lecturers and Exchange Professors	522,756.19	458,709.20	30,819.80	33,227.19

Pharmacy—Administration	3,312.99	2,719.92	593.07
Instruction	56,331.37	33,984.76	1,446.83
	<u>39,644.36</u>	<u>36,704.68</u>	<u>2,037.90</u>
			595.78
Special—Administration	6,034.83	5,883.88	150.95
University—Administration	6,032.88	5,292.17	750.71
Summer Sessions—Administration	8,994.15	5,159.88	3,834.27
Instruction	129,132.48	125,898.66	3,233.82
	<u>138,146.63</u>	<u>131,058.54</u>	<u>7,068.09</u>
Air Service—R. O. T. C.	6,483.38	5,279.18	1,204.20
Physical Education—Men	37,685.43	30,315.12	7,370.31
Women	41,485.31	38,314.39	6,170.92
	<u>79,170.74</u>	<u>68,629.51</u>	<u>13,541.23</u>
TOTAL—INSTRUCTION	2,661,660.87	2,383,867.94	190,995.24
			<u>86,797.69</u>

CURRENT EXPENSE (Continued)  
For the Year Ended August 31, 1917

	TOTAL	SALARIES	Other Expense	Excess Expense
42,507.57	95,548.22	14,110.82	42,507.57	
110,008.88	95,548.22	14,110.82	1,009.84	
100,208.43			1,347.10	

EDUCATIONAL AND GENERAL (Continued)

Excess—Under  
Other

MANUFACTURING AND OPERATIONS DEPARTMENT

Manufacturing

Materials—Under	277,837.69	53,695.91	224,141.78	
Materials—Over	8,780.98	4,720.42	4,051.56	
Depreciation	2,006.94	1,020.00	1,486.94	
Repairs and Maintenance	4,334.59	2,740.09	1,485.50	
Utilities—Manufacturing	5,023.82	2,740.92	2,273.60	
Utilities—General	55,571.58	700.00	54,671.58	
Utilities—Over	947.16	86.00	862.16	
Utilities—Under	314,881.73	68,724.34	246,075.39	

MANUFACTURING AND OPERATIONS DEPARTMENT

3,502,000.52	2,307,845.89	1,407,851.13	
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Hospital Administration 441,511.65 204,425.07 236,886.58

Dormitory 547,867.03 370,544.11 276,918.92

Household and Property  
 Laundry 72,527.43 70,047.89 2,480.44  
 Linen Supply 48,439.66 15,073.87 33,365.79  
 Housekeeping 191,163.63 165,875.90 25,287.73  
 Power 331,228.67 90,618.78 140,609.89  
 Total 543,359.39 341,615.54 201,743.85

Professional Care - General 113,416.14 99,885.14 33,531.00  
 Medical and Surgical 1,009,479.82 1,023,656.98 45,813.84  
 Nursing Care 102,007.18 38,293.04 63,714.21  
 Central Sterile Supply 17,437.41 4,735.87 9,071.74  
 Glove Room 1,318,460.72 1,161,626.91 157,223.79

CURRENT EXPENSE (Continued)  
For the Year Ended August 31, 1957

	TOTAL	SALARIES	OTHER EXPENSE	EQUIPMENT EXHIBIT G
<b>EDUCATIONAL AND GENERAL (Continued)</b>				
<b>HOSPITAL (Continued)</b>				
Professional Care—Special	13,797.39	11,409.25	2,388.14	
Post Anesthesia Room	186,257.43	127,778.22	58,479.21	
Operating Rooms	100,406.51	89,782.25	10,624.26	
Delivery Rooms	141,973.99	96,096.65	45,877.34	
Anesthesiology	21,743.27	12,428.94	9,314.33	
Inhalation Therapy	17,306.35	12,322.28	4,984.00	
Cardiology—Heart Station	6,403.99	5,262.38	1,141.61	
Fluorocencephalography	197,508.40	132,943.67	64,564.73	
Laboratories	146,622.53	27,088.79	119,533.74	
Pharmacy	54,992.59	52,907.98	2,084.61	
Physical Medicine	2,087.66	929.12	1,158.54	
Radiophone Laboratory	159,622.95	110,892.00	48,730.95	
X-Ray	61,600.31	52,592.83	9,007.48	
Medical Records	3,478.63	1,324.11	2,154.52	
Medical Library for Pathology and Histology	1,113,801.93	733,758.47	380,043.46	
<b>(Out-Patient Department)</b>				
Administration	70,018.56	35,027.33	34,991.23	
Nursing Care	63,381.82	63,381.82		
	133,400.38	98,409.15	34,991.23	

Cancer Clinic			
Administration	39,809.80	27,105.84	12,706.26
Medical and Surgical	57,206.07	30,882.06	26,324.01
Laundry and Linen Service	530.51		530.51
Housekeeping	5,450.63	4,515.60	924.03
Plant	13,300.46	3,657.81	9,744.65
Overhead Costs—Research	(—22,879.30)		(—22,879.30)
Depreciation—Equipment	2,100.00		2,100.00
	<u>95,217.17</u>	<u>66,177.01</u>	<u>29,440.16</u>

Miscellaneous	80.00		80.00
Administrative Service	6,128.01		6,128.01
Scholarships	4,170.30		4,170.30
Research and Interest—Room Charges	15,000.00		15,000.00
Nurses Home	83,191.54		83,191.54
Allowance for Doubtful Accounts	60,000.00		60,000.00
Depreciation—Building	124,200.00		124,200.00
Equipment	<u>292,769.85</u>		<u>292,769.85</u>

TOTAL HOSPITAL . . . . . 4,489,974.52      2,876,956.68      1,610,017.84



CURRENT EXPENSE (Continued)  
For the Year Ended August 31, 1957

AUXILIARY ENTERPRISES

Residence Halls

	Total	Salaries	Other Expense	Equipment Expend. G.
Spring Hall	47,123.09	15,034.63	32,088.46	
Welling Hall	17,962.28	4,275.39	13,686.89	
Recreation and Tennis Hall	1,721.63		1,721.63	
Freshman Quads	10,667.05	2,419.87	1,651.40	6,615.78
	<u>77,474.05</u>	<u>21,729.89</u>	<u>49,148.38</u>	<u>6,615.78</u>

Student Halls

	Total	Salaries	Other Expense	Equipment Expend. G.
2111 G Street, NW	821.30		821.30	
2129 G Street, NW	7,431.48		2,531.58	
2131 G Street, NW	614.00	200.00	414.00	
802 21st Street, NW	287.36		287.36	
	<u>9,154.14</u>	<u>200.00</u>	<u>4,054.24</u>	

Stores

	Total	Salaries	Other Expense	Equipment Expend. G.
Food Service—University	187,796.05	57,322.56	321,567.72	8,815.77
" "—Meadow School	54,572.11		48,927.51	59.69
Bookstore	23,779.66	12,749.17	11,030.79	
Duplicating Bureau	3,643.54	1,261.18	682.76	
	<u>269,791.36</u>	<u>71,332.91</u>	<u>483,208.78</u>	<u>8,875.46</u>

Total Auxiliary Enterprises

	549,969.55	99,837.71	435,411.40	15,491.24
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## STUDENT AID

57,254.84	57,254.84
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## Subtotals:

13,929,137.61	4,884,676.96	4,850,477.80	191,303.45
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## TOTAL EXPENSE

Less amount charged to various departments and included  
in "Other Expenditures"

640,471.67
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## TOTAL EXPENSE, ADJUSTED

13,868,665.94
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# INVESTMENTS OF CURRENT FUNDS

August 31, 1957

Bonds	Description	%	Value	
			Par	Book
Federal Level Bonds	Consolidated Farm Loan	2 1/4	40,000.00	49,240.00
	"	2 1/4	50,000.00	48,550.00
	"	3 1/4	60,000.00	60,000.00
State of Israel	Development Issue	4	1,000.00	1,000.00
	"	7 1/2	10,000.00	9,970.00
	"	7 1/2	43,000.00	62,433.00
United States of America	Continuation of Indebtedness	2 1/4	25,000.00	24,200.00
	Notes	2 1/4	25,000.00	24,125.00
	Priority	2 1/4	25,000.00	18,520.00
	Priority	2 1/4	20,000.00	24,550.00
	Priority	2 1/4	25,000.00	55,680.00
	Priority	2 1/4	50,000.00	46,400.00
	Priority	2 1/4	80,000.00	76,640.00
	Priority	2 1/4	50,000.00	48,550.00
	Priority	2 1/4	50,000.00	54,158.00
	Savings B	2 7/8		559,490.00

Stock—Preferred	Shares	100	14,000.00	15,892.50
U. S. Rubber Co.				
Totals—Exhibit A.....			561,338.00	575,352.50

TRUST NOTES RECEIVABLE  
 \$ Payments secured by 1221 New York Avenue, N.W. Due June 17, 1962. Interest 1 1/2%—Exhibit A  
 74,289.50



# ASSETS OF LOAN FUNDS

August 31, 1957

Funds	Total	Loans	
		Cash	Receivable
Honolulu Loan Fund	11,410.00	10,410.00	1,000.00
Honolulu Extension Loan Fund	82.35	82.35	
Kauai Extension Loan Fund	19,588.03	3,052.59	16,535.44
Kauai Loan Fund	1,881.46	309.17	1,572.29
Kauai Extension Loan Fund	1,031.83	431.33	600.00
Papa Aiea Loan Fund	1,981.74	848.74	1,133.00
School of Medicine Loan Fund	9,513.75	4,913.75	2,000.00
School of Medicine Loan Fund	1,453.10	203.10	1,250.00
St. Andrew's Loan Fund	9,033.83	8,410.83	623.00
University Loan Fund	4,720.37		4,720.37
War Loan Fund			
Total—Exhibit A...	61,296.92	30,962.82	30,334.10

SCHEDULE 4



[illegible]



## ASSETS OF ENDOWMENT FUNDS (Continued)

August 31, 1957

## CONSOLIDATED ENDOWMENT FUNDS (Continued)

				Yield	Date	Par	Market	Book
Bonds (Continued)								
Pennsylvania Railroad Co.				4 1/4	1984	25,000	20,500.00	26,230.00
"					1970	1,000	1,000.00	1,000.00
Penns. Edison Co.				4 1/2	1987	50,000	48,500.00	48,437.50
Penns. Electric Power Co.				4 3/4	1991	40,000	36,400.00	39,610.00
Pacific and Georgia Co.				3 3/4	1981	35,000	33,950.00	35,000.00
Pacific Telephone and Telegraph Co.				3 3/4	1987	80,000	49,500.00	50,000.00
Public Service Co. of Colorado				4 1/2	1986	50,000	48,500.00	50,600.00
Public Service Electric and Gas Co.				4 3/4	1980	50,000	45,500.00	53,410.00
Railroad Corporation of America				3 1/2	1978	80,000	24,000.00	30,000.00
Railroad Corporation of America				3	1972	50,000	47,500.00	49,630.00
R. I. Republic Telephone Co.				4 3/4	1982	25,000	21,800.00	25,000.00
Santa Barbara Acceptance Corp.				5	1986	50,000	52,500.00	51,160.00
Santa Barbara Acceptance Corp.				5	1970	5,000	5,200.00	5,530.00
Santa Barbara Acceptance Corp.				4 1/4	1983	50,000	52,500.00	50,903.50
Santa Barbara Acceptance Corp.				5 1/8	1974	1,000	1,050.00	1,200.00
Santa Barbara Acceptance Corp.				5	1972	5,000	4,800.00	5,000.00
Santa Barbara Acceptance Corp.				4 1/4	1960	20,000	19,600.00	20,000.00
Santa Barbara Acceptance Corp.				5	1974	24,000	21,120.00	24,410.00
Santa Barbara Acceptance Corp.				4 1/4	1976	25,000	24,500.00	25,160.00
Santa Barbara Acceptance Corp.				4 3/4				
First Mortgage Pipe Line.....				4 3/4				







Elect. Co.  
H. J. Heinz Co.  
International Harvester Co.  
Mason-Mihlen Co.  
May Department Stores  
McGraw-Hill Co.  
Milkmaid Co.  
Paine-Webber  
Papa's Gas and Electric Co.  
Parker Lighting Corporation  
Pittsburgh Plate Glass Co.  
Pittsburgh Plate Glass Co.  
Pittsburgh Plate Glass Co.  
R. J. Reilly Tobacco Co.  
Reynolds, George A., and Co.  
Virginia Electric and Power Co.

Cumulative	334	50	3,550.00	5,150.00
Cumulative	3.25	200	17,500.00	20,550.00
Cumulative	7	100	14,000.00	18,204.48
Cumulative	4	100	5,200.00	5,338.50
Cumulative	83.75	200	14,200.00	20,700.00
Cumulative	312	200	13,800.00	20,270.70
Cumulative	63.50	105	7,770.00	10,427.50
Cumulative	41.2	200	16,200.00	21,520.34
Cumulative	4.8	1000	23,000.00	27,250.00
Cumulative	84.75	300	30,000.00	29,700.00
Cumulative	4	200	17,200.00	20,172.40
Cumulative	3.7	200	14,400.00	20,500.00
Cumulative	3.8	100	8,400.00	10,270.00
Cumulative	3.6	100	7,400.00	10,017.84
Cumulative	86	1	100.00	100.00
Cumulative	84.04	300	24,000.00	30,051.00
Cumulative			383,115.00	491,418.65

# ASSETS OF ENDOWMENT FUNDS (Continued)

August 31, 1957

## CONSOLIDATED ENDOWMENT FUNDS (Continued)

SPECIAL ACCOUNT	SHARES	VALUE	
		MARKET	BOOK
Allegheny Manufacturing Co.	1,000	32,000.00	21,347.00
Armstrong Co. of Canada, Ltd.	2,740	108,240.00	109,170.00
American Cyanamid Co.	600	25,200.00	22,352.44
American Gas and Electric Co.	1,100	58,500.00	13,607.91
Armstrong Metal Co.	1,627	35,794.00	45,334.64
American Telephone and Telegraph Co.	326	56,724.00	49,448.82
Carpenter Corporation	220	17,160.00	12,947.75
Coca-Cola Co.	200	20,200.00	24,294.55
Continental Carbon Co.	300	12,300.00	14,215.85
Continental Cement Co.	500	28,300.00	20,163.14
Commonwealth Edison Co.	1,184	47,360.00	29,561.74
Continental Gas Co.	88	3,872.00	3,348.12
Continental Illinois National Bank and Trust Co. of Chicago	404	34,744.00	16,884.57
Continental Insurance Co.	400	17,000.00	18,088.35
Continental Oil Co.	840	47,880.00	9,454.95





ASSETS OF ENDOWMENT FUNDS (Continued)  
 August 12, 1937  
 CONSOLIDATED ENDOWMENT FUNDS (Continued)

	SHARES	MARKET	BOOK
Western Guaranty (Common)			
Public Service Electric and Gas Co.	500	15,000.00	15,002.09
Reliable Trust	750	7,700.00	8,721.43
R. J. Reynolds Tobacco Co.	100	5,000.00	5,112.50
Bank National Trust	679	84,875.00	62,455.00
United Savings Co.	535	9,715.00	5,058.50
Western Electric Co.	1,104	117,824.00	27,902.97
Western Union Telegraph Co.	737	31,902.00	20,573.88
Western Union Telegraph Co.	1,576	85,104.00	16,171.02
Standard Oil Co. of California	1,135	28,875.00	25,000.00
Standard Oil Co. of California	1,000	79,000.00	16,045.68
Western Union Telegraph Co.	47	4,650.00	3,802.50
Western Union Telegraph Co.	913	50,195.00	16,722.35
Western Union Telegraph Co.	400	16,000.00	19,657.52
Western Union Telegraph Co.	50	800.00	707.50
Western Union Telegraph Co.		12,555,564.00	907,231.40

5,706,026.00 3,241,422.19



## SYSTEM OF ENDOWMENT FUNDS (Continued)

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(continued)

Books	Donor	Page	Amount	Price
American Topographical and Bibliographic Co.	1980	25,000	19,250.00	25,000.00
Federal National Museum Association	1988	50,000	49,000.00	50,000.00
Twentieth Century Year Books	1978	15,000	15,920.00	15,700.00
Fort Monmouth	1967	12,000	12,120.00	12,420.00
Point Leno Waxway and Lard Co.	1997	25,000	21,750.00	26,570.00
Sakuma Food Productions	1992	20,000	19,200.00	20,000.00
Building Legal Settlements Database	1993	5,000	4,900.00	5,000.00
Holocaust	1974	15,000	13,200.00	15,250.00
Veritatis	1993-92	72,000	66,816.00	72,070.00
Savings G	1992	40,000	38,120.00	40,000.00
Veritatis B	1975-80	25,000	21,870.00	25,000.00
Savings R	1992	100,000	97,100.00	100,000.00
Veritatis K	1997	50,000	48,350.00	50,000.00
Veritatis	1978-83	50,000	46,450.00	50,000.00
General Information	1990	3,000	4,060.00	4,180.00
Continental Ferry Maritime Register	2001	14,000	8,120.00	12,500.00
Washington Cash Ledger Co. Wash. State Railroad Co.			462,620.00	472,515.00





# ASSETS OF ENDOWMENT FUNDS (Continue)

August 31, 1957

## SCOTTISH RITE FUND (Continued)

Stocks - Common	Shares	Market	Book
Amesbury Petroleum and Transport Co.	275	47,850.00	41,387.50
Champion Milling Machine Co.	1,000	39,000.00	18,609.10
Continental Mills Fibrous Co.	1,014	40,560.00	23,485.85
Continental Oil Co.	2,000	114,000.00	15,725.25
First Marine Co.	150	8,100.00	9,675.00
General Finance Co.	1,200	78,000.00	17,210.00
Griffiths Tire and Rubber Co.	881	77,528.00	10,358.62
Hecla Co.	500	12,500.00	14,562.50
International Nickel Co. of Canada, Inc.	300	25,800.00	13,032.50
Manitowish Water and Co.	1,500	54,000.00	32,577.25
New York State Electric and Gas Co.	50	19,250.00	22,025.15
Packard Electric Pipe Line Co.	300	13,200.00	10,563.64
Pharm Chemical Co.	119	6,024.00	5,073.00
Smith-Snyder Bank	602	82,750.00	42,616.00
Standard Oil Co. of California	486	26,244.00	2,501.88
Standard Oil Co. of New Jersey	3,210	303,000.00	37,854.29
Union Carbide and Carbon Corporation	900	89,000.00	25,121.50
United Gas Corporation	770	25,410.00	13,831.00
		772,404.00	346,704.15
Total - Stocks and Bonds		1,004,000.00	1,061,675.01
Cash			828.79

Total - Scottish Rite Fund ..... 1,000,000.00  
 RESERVE FOR PROTECTION OF SCOTTISH RITE INVESTMENTS ..... 62,798.80  
 1,062,798.80

# SUMMARY OF ASSETS OF ENDOWMENT FUNDS

August 31, 1957

	Total	Consolidated	Scottish Rite
Investments			
Bonds	4,305,919.14	3,782,404.14	523,515.00
Preferred Stocks	653,189.51	461,438.65	191,750.86
Common Stocks	1,344,327.73	997,623.40	346,704.33
Trust Notes	42,863.39	42,863.39	
Real Estate	196,047.00	196,047.00	1,091,970.01
	7,542,346.77	5,480,376.58	
Cash	21,204.17	20,375.38	828.79
Total Endowment Assets	7,563,550.94	5,500,751.96	1,092,798.80



# ENDOWMENT FUNDS—HELD IN TRUST BY OTHERS

August 31, 1957

Funds	Trustees	Book Value
Andrews Scholarship Fund.....	American Security and Trust Co.	5,194.95
Coope Unrestricted Fund.....	Riggs National Bank	22,461.97
Fry Professorship Fund.....	National Savings and Trust Co.	106,067.98
Harvey Scholarship Fund.....	Riggs National Bank	4,650.63
Sanders Fellowship Fund.....	National Savings and Trust Co.	210,404.46
Sanders Hospital Fund.....	Washington Home for Invalids	29,151.03
Sharpe School of Medicine Fund.....	National Savings and Trust Co.	8,216.79
Spencer Scholarship Fund.....	Northern Trust Co.	7,422.20

TOTAL—EXHIBIT A.....393,570.01

# ASSETS OF PLANT FUNDS

August 31, 1957

## CONSOLIDATED PLANT FUNDS

BONDS	Description	%	Ded.	Value	
				PAID	Book
United States of America	Savings G	2 1/2	1957	500	500.00
	Savings G	3 1/2	1961	3,481.00	3,000.00
	Savings F	2 1/2	1957	100	86.10
	Savings K	3 7/8	1962	4,000	4,000.00
				<u>7,922.00</u>	<u>8,186.10</u>
Cash					18,344.62
Total					<u>26,530.72</u>

## LAW CENTER FUND

BONDS	Description	%	Ded.	PAID	Book
C. I. T. Financial Corporation—Debtors	Consolidated Farm Loan	2 1/2	1959	25,000	24,000.00
Federal Land Banks	Federal National Mortgage Association—Notes ML 1955 A	3 1/2	1958	25,000	24,800.00
Federal National Mortgage Association—Notes ML 1955 A	Savings G	3 1/2	1961	15,000	14,550.00
United States of America	Savings H	2 1/2	1958	100	91.40
				<u>77,000.00</u>	<u>79,331.40</u>
STOCK—COMMON	Houston Oil Co. of Texas			Shares	1.00
Cash					50,743.32
Total					<u>130,095.72</u>

## ASSETS OF PLANT FUNDS (Continued)

August 31, 1957

## PAIRO FUND

Boxes	Description	Cost	Pay	Value Market	Book
	First and Refunding Mortgage	30 1/2	6,000	3,300.00	4,636.00
Morris and James Railroad Co.	First Mortgage A	41 1/2	5,000	4,500.00	5,121.00
Southwestern Pacific Co. of Oregon Limited	First Mortgage A	28 1/2	50,000	49,400.00	49,218.75
United States of America	Treasury	21 1/2	500	438.00	500.00
"	Treasury	21 1/2	1,200	1,190.00	1,178.40
"	Savings G.	3 1/4	1,000	929.00	1,000.00
"	Treasury			59,787.00	61,654.15

Stocks - Common	Shares	Value Market	Book
American Security and Trust Co.	220	9,240.00	7,857.40
Morgan Guaranty Trusting Co.	300	16,500.00	15,809.25
Pratt and Corporation	105	1,575.00	1,300.00
		27,315.00	24,966.65
		87,072.00	

14,950.41

101,508.41

CASH

TOTAL



# FORD FOUNDATION HOSPITAL BUILDING FUND

BASIS	United States of America		Non-Resident		Certificates of Indebtedness	
	1961	1962	1963	1964	1965	1966
CASH	113,000.00	113,000.00	113,000.00	113,000.00	113,000.00	113,000.00
TOTAL	113,000.00	113,000.00	113,000.00	113,000.00	113,000.00	113,000.00

## SUMMARY OF ASSETS OF PLANT FUNDS

August 31, 1957

	Consolidated		Ford		Law Center		Papers	
	Total	Investments	Total	Investments	Total	Investments	Total	Investments
INVESTMENTS								
Bonds	375,191.65	375,191.65	226,000.00	226,000.00	79,351.40	79,351.40	61,654.15	61,654.15
Common Stocks	24,964.65	24,964.65	226,000.00	226,000.00	1.00	1.00	24,964.65	24,964.65
	400,156.30	400,156.30			79,352.40	79,352.40	86,617.80	86,617.80
CASH	89,247.00	89,247.00	5,219.05	5,219.05	50,743.32	50,743.32	14,750.61	14,750.61
TOTAL—Exhibit A	489,403.30	489,403.30	231,219.05	231,219.05	130,095.72	130,095.72	101,404.41	101,404.41

## LAND AND BUILDINGS

For the Year Ended August 31, 1957

Building or Location	Lot	Square Acres	Year Acquired	Balance Aug. 31, 1956	Net Additions	Balance Aug. 31, 1957
Adams Hall	824	120	1947		445,000.00	445,000.00
Alumni Center	23	56	1954	15,000.00		15,000.00
Brown Hall	39	102	1956	135,000.00	17,926.09	152,926.09
Brumfield Science Building C	Part of 834	102	1914-35	151,129.97		151,129.97
Book Room	Part of 843	79	1949	46,105.49		46,105.49
Chapin Hall	Part of 843	79	1948	85,301.23		85,301.23
Clemens Research Building, C Street	30				15,000.00	15,000.00
Crocker Hall	Part of 844	102	1919-24	327,481.92		327,481.92
Deering Hall - Part of Square 56			1948	50,000.00		
Faculty Parking Lot 14, 16, 17-18-19, 20, 24, 25, 26, 27, 28, 29		56	1936	236,431.05		236,431.05
Faculty Parking Lot 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100		57	1936		301,125.00	301,125.00
Feld Hall - 511, 11-17, 19, 20, 26, 35-46, 47, 48, 49, 42, 500-501		102	1924-25	58,331.44		58,331.44
Greenhouse	Part of 844	79	1918-38	114,311.39	15,433.75	129,745.14
Hall of Government	844-846	54	1945	7,666,466.64	223.81	7,666,690.45
Hospital	Part of Square	40	1940	9,500.00	229,242.92	238,742.92
Hospital Parking Lot 34, 35-301 then 308, 310 then 311-324			1955	1,200.00		1,200.00
Law Center Building	824-828, 841	79	1926-41	879,976.91		879,976.91
Lower Administration	Part of 844	102	1912-39	384,029.52		384,029.52
Lower Library	840	56	1957		425,000.00	425,000.00
Medical Hall	Part of 844	102	1923-30	57,583.87		57,583.87
Memorial (Administration)	843	79	1938-51	696,484.24	15,433.75	711,917.99
Museum Hall						

Nurses Home . . . .	844	55	1947	401,500.00	401,500.00
Parking Lot—2144 1 St., NW	811	41	1945-53	587,787.43	587,787.43
Pharmaceutical Laboratory	27 28 51 6 817	79	1944	100,001.18	100,001.18
Physics Laboratory	Part of 843	79	1947	26,075.12	26,075.12
President's Office	Part of 834	102	1936	11,700.00	11,700.00
School of Medicine	43	250	1882-1952	695,706.34	695,706.34
Shop, Stockroom	53	101	1943	26,761.24	26,761.24
Social Sciences Building D	Part of 834	102	1922-36	543,305.70	543,305.70
Security Hall	816	80	1948	30,000.00	30,000.00
2112 G Street, NW	805	79	1936	36,989.72	36,989.72
2129 G Street, NW	Part of 8	79	1935	25,500.00	25,500.00
2131 G Street, NW	35	77	1938	13,000.00	13,000.00
802 21st Street, NW	834 835	79	1941	62,574.67	62,574.67
Stoughton Hall	Part of 834	102	1920-25	279,325.93	279,325.93
Stockton Hall	41	79	1947	75,000.00	75,000.00
Student Activities Building	804 836	79	1947-48	528,057.96	528,057.96
Student Union Building	843	56	1953	671,535.00	843,357.22
Townshank Engineering Building	Entire Square	89	1948-52	461,670.18	469,542.78
Warwick Memorial Building	15	55	1947	209,047.72	209,047.72
Wellington Hall				171,822.22	
				7,872.00	

# LAND AND BUILDINGS—(Continued)

For the Year Ended August 31, 1957

Building Location	Lot	Square Feet	Year Acquired	Balance August 31, 1956	No. Acres	Balance August 31, 1957
G Street, NW 1910	C	121	1949	20,000.00	.....	20,000.00
2002	27	103	1949	31,600.00	.....	31,600.00
2024	16	103	1922	14,955.00	.....	14,955.00
2026	15	103	1929	15,074.96	.....	15,074.96
2028	13	103	1957	32,500.00	21,000.00	21,000.00
2030	Part of s34	102	1922	19,000.00	.....	19,000.00
2033	s17	80	1937	31,500.00	.....	31,500.00
2109	41	80	1946	69,479.23	.....	69,479.23
2108	40	80	1949	47,250.00	.....	47,250.00
2110	s15	80	1949	20,500.00	.....	20,500.00
2114	A	80	1946	17,500.00	.....	17,500.00
2116	B	80	1946	14,000.00	.....	14,000.00
2118	s07	79	1943	500.00	7,300.00	7,800.00
2135	26	57	1956	8,800.00	.....	8,800.00
2220	25	57	1948	23,400.00	.....	23,400.00
2222	s03 s29	42	1947	32,500.00	.....	32,500.00
2113 15-17 19 21	s00	119	1948	67,711.70	.....	67,711.70
H Street, NW 1900	3	119	1948	32,500.00	.....	32,500.00
1911 17	s02	119	1932	38,000.00	.....	38,000.00
1921	s03	119	1949	190,000.00	.....	180,000.00
1923	s00 thru s05	101	1936	13,000.00	.....	13,000.00
2001	s06	101	1943	.....	.....	.....
2011	.....	.....	.....	.....	.....	.....



2017	s10	101	1954	25,000.00		25,000.00
2020	Part of s34	102	1952	98,516.71		98,516.71
2021	s1	101	1954	12,000.00		12,000.00
2025	s2	101	1945	21,000.00		21,000.00
2027	s13	101	1941	11,000.00		11,000.00
2029	s14	101	1945	11,500.00		11,500.00
2031	s15	101	1948	13,000.00		13,000.00
2037	s17	101	1940	23,500.00		23,500.00
2107-09	s00-s01	77	1956	34,000.00	8,246.31	42,246.31
2113	s02-s04-s05	77	1940	42,431.25		42,431.25
2125	s08	77	1954	21,000.00		21,000.00
2127	s09	77	1946	7,500.00		7,500.00
2136	s3 then s9	79	1951	85,000.00		85,000.00
2137	s10-s11	77	1948	30,500.00		30,500.00
2142	10	79	1955	1,500.00		1,500.00
2142 1/2	s15	79	1940	3,000.00		3,000.00
2209	s01	55	1945	6,650.00		6,650.00
2211	16	55	1948	16,125.00		16,125.00
2213	17	55	1946	13,000.00		13,000.00
2217	18 1/2 s05	55	1944	32,500.00		32,500.00
2300	s17	42	1942	10,750.00		10,750.00
2308	43	42	1948	7,900.00		7,900.00
2312	s14	42	1948	7,000.00		7,000.00
2316	s12	42	1947	9,600.00		9,600.00
2318	s11	42	1955	7,000.00		7,000.00
2324	s09	42	1956	4,000.00	4,000.00	4,000.00

## LAND AND BUILDINGS (Continued)

For the Year Ended August 31, 1957

Buildings or Land	Lot	Section	Year Acquired	Revised Acq. Val.	Net Additions	Revised Acq. Val.
1 Street, NW 2012	824-830-831	101	1943	68,000.00		68,000.00
" " 2018	21	101	1946	50,000.00		50,000.00
" " 2019	840	101	1942	10,000.00		10,000.00
" " 2126	27	77	1947	11,800.00		11,800.00
" " 2114	824-833-834	77	1947	12,500.00	27,150.00	39,650.00
" " 2109	826	77	1948	15,000.00		15,000.00
" " 2108	835	77	1945	5,000.00		5,000.00
" " 2204	22	55	1949	12,000.00		12,000.00
10th Street, NW 808	20	119	1949	30,000.00		30,000.00
20th Street, NW 700	Part of 834	102	1931	17,500.00		17,500.00
" " 706	23	102	1950	36,870.03		36,870.03
" " 712	Part of 834	102	1929	14,240.00		14,240.00
" " 714	Part of 834	101	1940	14,500.00		14,500.00
" " 716	Part of 834	102	1929	13,500.00		13,500.00
" " 718	Part of 834	102	1929	20,000.00		20,000.00

21st Street, NW--604	23	80	1946	15,000.00	29,500.00	13,000.00
" " 606-08	21 22	80	1935	12,500.00		12,500.00
" " 713 15 17	Part of 834	102	1929	24,000.00		53,500.00
" " 714	Part of 841	79	1931	40,000.00		40,000.00
" " 716	Part of 841	79	1933	8,885.00		8,885.00
" " 718	Part of 841	79	1939	16,422.00		16,422.00
" " 810	81	77	1938	9,000.00		9,000.00
" " 812	841	77	1954	21,000.00		21,000.00
" " 814	840	77	1944	13,000.00		13,000.00
22nd Street, NW--715	24	79	1939	8,190.00		8,190.00
" " 717	25	79	1940	10,143.00		10,143.00
" " 719	810	79	1952	20,000.00		20,000.00
" " 725	812 813	79	1938	8,750.00		8,750.00
" " 727	814	79	1937	4,750.00		4,750.00
" " 731	34	79	1945	7,400.00		7,400.00
" " 800 02	802 803	55	1946	18,500.00		18,500.00
" " 804	801	55	1956	16,500.00		16,500.00
" " 806	800	55	1945	9,000.00		9,000.00
" " 808	C	55	1946	14,000.00		14,000.00
" " 810	839	55	1948	18,750.00		18,750.00
" " 817	817 818 819	77	1948	35,800.00		35,800.00
" " 818	831	55	1952	25,000.00		25,000.00
" " 820	830	55	1945	7,000.00		7,000.00
" " 822	829	55	1947	9,250.00		9,250.00
" " 835	50	77	1956	11,000.00	9,500.00	9,500.00
" " 909	815	75	1946	12,000.00		11,000.00
" " 911	816	75	1950	12,000.00		12,000.00
" " 921	850	75	1948	12,500.00		12,500.00

# LAND AND BUILDINGS (Continued)

For the Year Ended August 31, 1957

Building	Lot	Area	Year Acquired	Balance August 31, 1957	Balance August 31, 1957
21st Street, NW 211-13	21-211	57	1948	13,500.00	13,500.00
	822-824-825	42	1942	3,675.00	3,675.00
	827	42	1944	7,425.00	7,425.00
	825	42	1949	11,000.00	11,000.00
	824	42	1942	4,500.00	4,500.00
	817	42	1942	3,000.00	3,000.00
	815	41	1957	31,000.00	31,000.00
	829	40	1949	17,750.00	17,750.00
	830	40	1953	16,500.00	16,500.00
	829	40	1957	20,000.00	20,000.00
	910	40	1957	23,000.00	23,000.00
	914	40	1957	16,500.00	16,500.00
	918	40	1957		
	924	40	1957		
24th Street, NW 257	807-808	42	1947	11,440.00	21,440.00



Pennsylvania Avenue, NW—  
 1000 02 04 06 08  
 1 1214 16  
 4 1220  
 7 2100  
 2 2114 16-18 24  
 2 2130

New Hampshire Avenue, NW—939  
 921 25

12 19  
 812  
 813  
 800-801-840  
 21 833-836 837  
 831

119 1949  
 119 1950  
 119 1949  
 75 1945  
 75 1950  
 75 1950

180,000.00  
 70,000.00  
 70,000.00  
 105,000.00  
 30,000.00  
 11,000.00

102,000.00  
 28,042.00

180,000.00  
 70,000.00  
 70,000.00  
 105,000.00  
 30,000.00  
 11,000.00  
 28,042.00

Less Depreciation—Hospital

18,774,945.74  
 480,000.00  
 18,294,945.74

1,932,518.45  
 60,000.00  
 1,872,518.45

20,707,264.19  
 540,000.00  
 20,167,264.19

\* The University had a contract and option to purchase from The Washington House for Fourteen Year valued at \$51,046.00 for \$1.00 plus the fair market value, less depreciation, of the portion of the Warwick Memorial Building, located to The Washington House for Fourteen, at the time of the exercise of such option.

TOTAL—EXHIBIT A

# EQUIPMENT

For the Year Ended August 31, 1957

	BALANCE AUGUST 31, 1956	ADDITIONS	BALANCE AUGUST 31, 1957
Administration	290,794.07	38,467.15	329,261.20
Book Stores	13,396.96	8,875.46	22,272.42
Cancer Clinic	57,725.33	11,161.26	68,886.59
Faculty Dining Room	2,284.48		2,284.48
Gymnasium	2,927.37		2,927.37
Hospital	1,408,011.94	107,102.13	1,515,114.07
Homing Resources Laboratory	48,324.48		48,324.48
Instruction - General	188,516.47	22,372.82	210,889.29
- Law School	4,507.56		4,507.56
- School of Engineering	137,378.29	123,159.75	260,538.04
- School of Medicine	132,406.54	33,227.19	165,633.73
- School of Pharmacy	24,450.16	905.78	25,355.94
Interns' Residence	4,302.62		4,302.62
Library Books - General	308,755.19	30,078.51	338,833.70
- Law School	147,124.28	11,999.85	159,124.13
- School of Medicine	50,209.95	8,504.64	58,714.59

Library Acquisition	94,844.28	1,039.84	94,844.28
Library Library	50,046.61	6,615.78	60,086.45
Medical Hall			6,615.78
Medical Vehicles	4,352.01		4,352.01
Nurses Home	9,710.60		9,710.60
Strong Hall	18,200.00		18,200.00
Student Union	36,406.09		36,406.09
Wellington Hall	30,805.34		30,805.34
	<u>8,034,280.22</u>	<u>403,510.14</u>	<u>8,437,790.36</u>
Less Depreciation Cancer Clinic Laboratory	8,400.00	2,100.00	10,500.00
Hospital Improvements	979,800.00	124,200.00	1,084,000.00
	<u>28,200.00</u>	<u>126,400.00</u>	<u>1,074,000.00</u>
TOTALS - FUND A	14,180.22	277,210.14	2,413,690.36

Schedule 9











DESIGNATED CURRENT FUNDS—ORGANIZED RESEARCH (Continued)

For the Year Ended August 31, 1967

Funds	Balance Available at Year	Receipts	Disbursements			Balance Available at Year
			Salaries	Other Expenses	Total	
Sum of Municipal Government						
H-2020	731.00	(80.31)	8,215.02	(151.28)	(151.28)	1,820.20
H-2100-01	11,000.21	11,000.21		1,177.04	9,620.35	
H-2101	1,001.16	(1,111.79)		1,126.21	1,126.21	
H-2104-01	11,000.00	11,000.00	8,741.47	4,017.21	12,758.68	
H-2104-02	11,000.00	11,000.00	18,116.47	29,611.00	48,110.45	
H-2104-03	11,000.00	11,000.00	8,148.77	2,074.77	10,421.44	
H-2104-04	11,000.00	11,000.00	4,011.15	4,041.21	9,482.06	
H-2104-05	11,000.00	11,000.00	2,111.00	2,111.00	3,718.64	
H-2104-06	11,000.00	11,000.00		801.18	208.05	4,830.71
H-2104-07	11,000.00	11,000.00		1,100.00	3,000.00	
H-2104-08	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-09	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-10	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-11	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-12	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-13	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-14	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-15	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-16	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-17	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-18	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-19	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-20	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-21	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-22	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-23	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-24	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-25	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-26	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-27	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-28	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-29	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-30	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-31	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-32	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-33	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-34	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-35	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-36	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-37	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-38	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-39	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-40	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-41	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-42	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-43	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-44	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-45	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-46	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-47	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-48	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-49	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-50	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-51	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-52	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-53	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-54	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-55	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-56	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-57	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-58	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-59	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-60	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-61	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-62	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-63	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-64	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-65	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-66	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-67	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-68	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-69	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-70	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-71	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-72	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-73	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-74	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-75	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-76	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-77	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-78	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-79	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-80	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-81	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-82	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-83	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-84	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-85	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-86	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-87	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-88	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-89	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-90	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-91	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-92	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-93	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-94	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-95	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-96	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-97	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-98	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-99	11,000.00	11,000.00		1,100.00	2,000.00	
H-2104-100	11,000.00	11,000.00		1,100.00	2,000.00	









# INVESTMENT INCOME

For the Year Ended August 31, 1925

Funds	Balance August 31, 1925	Net Income	Disbursements		Balance August 31, 1925
			Current Operations	Added or Withdrawn	
<b>UNITED INVESTMENT FUNDS SUMMARY 12</b>					
<b>UNITED STATES</b>					
Alabama		18.00	18.00		
Arizona		44.00	44.00		
Arkansas		28.00	28.00		
California		13.00	13.00		
Colorado		11,153.00	11,153.00		
Connecticut		861.61	861.61		
Delaware		15,147.01	15,147.01		
District of Columbia		2,484.51	2,484.51	8.49	
Florida		45.00	45.00		
Georgia		119.00	119.00		
Idaho		2,006.00	1,998.00		
Illinois		60.00	60.00	8.00	
Indiana		1,147.00	1,147.00		
Iowa		60.00	60.00		
Kansas		807.00	807.00		
Louisiana		60.00	60.00		
Maine		126.00	126.00		
Massachusetts		278.00	278.00		
Michigan		748.00	748.00		
Minnesota		80.00	80.00		
Mississippi		8,178.00	8,178.00		
Missouri		94.00	94.00	5.00	
Montana		6.00	6.00		
Nebraska		597.00	597.00		
Nevada		60.00	60.00		
New Hampshire		1,000.00	1,000.00	8.00	
New Jersey		2,000.00	2,000.00		
<b>TOTAL</b>		40,000.00	40,000.00		





# INVESTMENT INCOME (Continued)

For the Year Ended August 31, 1957

Funds	Balance August 31, 1956	Net Income	Disbursements		Balance August 31, 1957
			Current Operations	Added by Purchase	
ENDOWMENT FUNDS (Continued) (Schedule 12)					
Educational Foundations					
Carter Clinic—Carter Clinic					
• Scripps		13.00	13.00		
		1,456.17	1,456.17		
Scholarship					
Hospital—Baylor		463.80	463.80		
• Chapman		77.00	77.00		
• Chapman		60.00	60.00		
• Chapman		86.00	86.00		
• Hark		2,231.00	2,226.00		
• Houser		149.00	149.00	9.00	
• Klafman		60.00	60.00		
• Kluegel		187.00	175.00	8.00	
• Kuthark		246.00	246.00	98.00	
• Maloney		30.00	30.00		
• National Park Seminary		2,441.00	2,441.00		
• Parker, A. J.		30.00	30.00		
• Pauling, L.		800.00	800.00		
• Seeger		501.00	501.00		
• Tice		597.00	597.00		
• Woolfery					8,111.00



INVESTMENT INCOME (Continued)  
For the Year Ended August 31, 1957

Funds	Balance August 31, 1956	Net Income	Disbursements		Balance August 31, 1957
			Current Operations	Added to Principal	
EDUCATIONAL FUNDS (Continued)					
Boardman	112.80	210.00	65.30		257.50
Booth	192.80	179.00	150.30		221.50
Chadler	74.00	60.00	54.00		80.00
Conover	91.00	60.00	60.00		91.00
Cover	115.00	45.00	60.00		100.00
Davis	441.00	179.00	289.00		331.00
Edgell	50.00	89.00	71.00		68.00
Farr	224.00	60.00	71.00		213.00
Ford	41.00	22.00	30.00		33.00
Gibbs	82.00	60.00	25.00		117.00
Hill	187.00	48.00	2.00		233.00
Johnson	11.00	6.00	10.00		7.00
Kennedy	147.00	205.00	147.00		205.00
Lang	71.00	52.00	60.00		63.00
Marshall	141.00	30.00	15.00		156.00
McDonald	24.00	17.00	15.00		26.00
Miller	50.00	60.00	60.00		50.00
Moore	42.00	80.00	80.00		42.00
Ward	771.00	278.00	310.00		739.00
			1,615.00		
Grand Totals					

Investment Income



Hospital Expenses—Women's Board

Upper Back Chapter	2,244.68	1,142.00	1,556.08	53.00
" " Hospital Expense	44.00	10.80		59.00
" " Hospital Expense	27.00	12.00		1,740.00
" " Hospital Expense	5,207.00	900.00	120.00	471.00
" " Hospital Expense	411.00	60.00		8,000.00
" " Hospital Expense	2,701.00	627.00		1,100.00
" " Hospital Expense	1,200.00	127.00		1,100.00
Excess of		120.00		

PERPETUITIES AND TRUST FUNDS (continued)

Perpetuity Fund	17,140.19	17,140.19	1.04
Perpetuity Fund	2,000.00	2,000.00	

PERPETUITIES AND TRUST FUNDS (continued)

Perpetuity Fund	17,140.19	17,140.19	1.04
Perpetuity Fund	2,000.00	2,000.00	
Perpetuity Fund	11,000.00	11,000.00	
Perpetuity Fund	81.00	81.00	
Perpetuity Fund	110.00	110.00	
Perpetuity Fund	4,000.00	4,000.00	

Schedule 1

TOTALS—PERPETUITIES AND TRUST FUNDS

TOTALS—PERPETUITIES AND TRUST FUNDS	47,740.07	265,880.00	221,110.59	103,800.00
TOTALS—PERPETUITIES AND TRUST FUNDS	96,740.07	312,811.00	208,212.72	107,800.00

# DESIGNATED CURRENT FUNDS—MISCELLANEOUS

For the Year Ended August 31, 1957

Funds	Balance August 31, 1956	Additions		Deductions	Balance August 31, 1957
		Cash	Other		
<b>SCHOLARSHIP FELLOWSHIP</b>					
Air Force All Service	350.00			Scholarships	350.00
American Women's Club		100.00		"	15.50
Alpha Delta Omega Pharmaceutical Fraternity	419.50	500.00		"	519.50
American Foreign Service Association	31.00				31.00
American Foundation Pharmaceutical Education					
Scholarship		400.00		Scholarships	400.00
Fellowship	1,500.00	1,200.00		Tuition Scholarships	3,700.00
American Society of Women Accountants	1,000.00	1,000.00		Scholarships	1,000.00
Delta Omega Alpha Association	200.00	100.00		Scholarships	320.00
Glenn Foundation	120.00				10.00
Goodwill Women	100.00	204.00			304.00
Goodwill Women	100.00	240.00			340.00
D. C. Pharmaceutical Association	500.00	1,220.00			1,720.00
Evangelical Free and Baptist Ch.		1,250.00			3,250.00
Goodwill Men's Club					100.00
Goodwill Men's Club	100.00	500.00			600.00
Goodwill Men's Club		75.00			175.00
Goodwill Men's Club	150.00				150.00
Goodwill Men's Club	500.00				400.00
Goodwill Men's Club	2,000.00	1,200.00			3,200.00
Goodwill Men's Club		724.00			724.00
Goodwill Men's Club		100.00			100.00
Goodwill Men's Club	250.00	254.00			504.00



# DEDICATED CURRENT FUNDS—MISCELLANEOUS—Continued

For the Year Ended August 31, 1957

Funds	Balance August 31, 1956	Additions		Deductions	Balance August 31, 1957
		Cash	Other		
COMMUNITAS COLLEGE Mebank Foundation—Religion	2,500.00	10,000.00		To Schedule 1	2,500.00
LAW SCHOOL					
Fund Law Institute	1,000.00	1,000.00		To Schedule 1	1,000.00
Moses Herman	67,000.00	31,172.25		To Schedule 1	1,000.00
Parents' Trade-mark Copyright Foundation			1,001.00	To Schedule 1	50,400.00
Investment Institute		1,400.25		To Schedule 1	2,421.85
Commerce Department		181.00			181.00
Washington Foreign Law Society Publications					
LIBRARY					
Art Maintenance		400.00		To Schedule 1	400.00
Museum Room		384.40			184.40
SCHOOL OF EDUCATION					
Phi Delta Kappa Fraternity—Adult Visual Equipment		250.00		To Schedule 1	250.00
SCHOOL OF GOVERNMENT					
United States—Washington		100.00		To Schedule 1	100.00





# DESIGNATED CURRENT FUNDS—AGENCY

For the Year Ended August 31, 1957

Funds	Balance August 31, 1956	Deposits	Withdrawals	Balance August 31, 1957
Davis Hadetina House.....	14.14	.....	.....	14.14
Flowers.....	86.85	.....	10.00	76.85
National University Docket.....	100.00	.....	100.00	
R.O.T.C.....	192.61	284.15	433.90	42.86
Women's Board of the Hospital.....				
Women's Board Counter.....	560.23	7,375.40	7,571.45	364.18
Women's Board Gift Shop.....	13,138.57	30,212.59	34,311.35	9,039.81
Women's Board Memorial.....	200.00	.....	.....	200.00
TOTALS—EXHIBIT D	14,292.40	37,872.14	42,426.70	9,737.84

# CHANGES IN PRINCIPAL OF LOAN FUNDS

For the Year Ended August 31, 1957

Uses	Balance August 31, 1956	Additions		Collected for U. S. Government	Balance August 31, 1957
		Grants	Interest on Loans		
Houses		11,410.15	81		11,410.96
Home Improvement	382.35				382.35
Feeding	19,759.08	5.00	223.95		19,988.03
Law Associations	1,867.43		14.03		1,881.46
Prison	1,026.33		5.00		1,031.33
Schools	1,760.77	10.00	10.97		1,781.74
School of Medicine	6,090.37	3,436.56	10.82		9,513.75
Supplies and	1,453.10				1,453.10
Universities	8,812.76	53.00	108.07		9,033.83
War	4,819.03			198.66	4,620.37
TOTALS - EXPENDITURE	46,147.22	14,914.71	433.65	198.66	61,296.92

SCHEDULE 11





RECEIPTS

From State	75,122.00				75,122.00
From City	55,000.00				55,000.00
From County	210,000.00				210,000.00
From Federal Government					
From Private Donations					
From Sale of Land					
From Sale of Buildings					
From Sale of Furniture					
From Sale of Other Property					
From Interest on Bonds					
From Dividends					
From Rents					
From Profits					
From Other Sources					
<b>Total</b>					<b>210,404.46</b>

From State	800.00				800.00
From City	500.00				500.00
From County	125,000.00				125,000.00
From Federal Government					
From Private Donations					
From Sale of Land					
From Sale of Buildings					
From Sale of Furniture					
From Sale of Other Property					
From Interest on Bonds					
From Dividends					
From Rents					
From Profits					
From Other Sources					
<b>Total</b>					<b>175,300.00</b>

From State	175,000.00				175,000.00
From City	200,000.00				200,000.00
From County	10,000.00				10,000.00
From Federal Government					
From Private Donations					
From Sale of Land					
From Sale of Buildings					
From Sale of Furniture					
From Sale of Other Property					
From Interest on Bonds					
From Dividends					
From Rents					
From Profits					
From Other Sources					
<b>Total</b>					<b>2,121.00</b>





# CHANGES IN PRINCIPAL OF ENDOWMENT FUNDS (Continued)

For the Year Ended August 31, 1937

Funds	Balance August 31, 1936.	Additions			Deductions	Balance August 31, 1937
		Gross	Investment Income	Other		
RESTRICTED (Continued)						
SCHOLARSHIP						
Anderson	5,194.95					5,194.95
Barnes	20,040.00		6.00			20,046.00
Bailey	2,700.00					2,700.00
Bradley	48,610.00					48,610.00
Carr	5,000.00					5,000.00
Carter, H. H.	1,000.00					1,000.00
Carter, M. M.						
College for Women Funds						
Baxter	1,200.00					1,200.00
Chapman	2,500.00					2,500.00
College Women	500.00					500.00
President of College for Women	5,000.00					5,000.00
Harris Foundation		2,000.00				2,000.00
Harris	5,000.00					5,000.00
Leahy	5,000.00					5,000.00
M. Williams	1,000.00					1,000.00
W.	1,000.00					1,000.00





[illegible]

11-11-11

[illegible]

FRASE				
	14, 926 00			14, 926 00
total are	14, 926 00			14, 926 00
National University Library	18, 000 00			18, 000 00
Scholar National University Library	1, 520 00			1, 520 00
	4, 221, 344 84	2, 565, 230 75	7, 120 12	6, 174, 704 77
	99, 300 00			99, 300 00
Consolidated Endowment Funds	50, 000 00			50, 000 00
Gifts for the Endowment	50, 000 00			50, 000 00
State of the Fund	50, 000 00			50, 000 00
Gifts for the Endowment	50, 000 00			50, 000 00
	4, 380, 922 45	2, 565, 230 75	7, 120 12	6, 957, 122 77

TOTALS—EXHIBIT F (continued)

## CHANGES IN PRINCIPAL OF PLANT FUNDS

For the Year Ended August 31, 1937

Particulars	Balance August 31, 1936	Additions		Deductions		Balance August 31, 1937
		Cash	Investment Income	Plant	Other	
General Plant Equipment	417.11					417.11
Bank Building (See Statement)	2,047.00	3,200.00		2,768.34		2,478.66
Subtotal	464.11					464.11
Plant House	750.00	445.00	15.00			1,210.00
Post-Office Building	111,250.00	111,250.00	4,719.45			227,219.45
General Plant Equipment	421.61	45.00		449.22		12.39
Subtotal	421.61	45.00		449.22		17.39
General Plant Equipment	44.00	2,911.00		2,911.00		44.00
General Plant Equipment	1,718.80	100.00		1,818.80		0.00
General Plant Equipment	202.50			18.00		184.50
General Plant Equipment	100.00					100.00
General Plant Equipment	1,025.19	2,300.00		4,000.77		324.42
General Plant Equipment	97,791.11	12,000.00	2,481.78			112,272.89

Total General Plant Funds

Transferred to Building Fund















# DESCRIPTION OF LOAN FUNDS

August 31, 1957

HUMAN LOAN FUND—Created in 1937 by Joseph H. Hines to be loaned to students of the School of Medicine.	11,410 96
HUMAN LOAN FUND—Created in 1940 by the D. C. Home Economics Association to be loaned to women students majoring in Home Economics.	382 35
RELIGIOUS LOAN FUND—Created in 1942 by the W. K. Kellogg Foundation to be loaned to students of the School of Religion.	19,088.05
LAW ADMINISTRATIVE LOAN FUND—Created in 1941 by the George Washington Law Association to be loaned to students of the Law School.	1,881 46
PHYSICS LOAN FUND—Created in 1943 by Ohio, Penna. and Co., Inc., to be loaned to students of the School of Medicine.	1,031 53
SUMMER LOAN FUND—Created in 1931 for summer loans to be loaned to students of the School of Medicine.	1,981 74
SCHOOL OF MEDICINE LOAN FUND—Created in 1942 by School of Medicine Association to be loaned to students of the School of Medicine.	9,513 75
SCHOOL OF NURSING LOAN FUND—Created in 1941 by Blum L. Schulz and other donors, to be loaned to students of the School of Nursing.	1,451 10
UNIVERSITY LOAN FUND—Created in 1938 by the University for students short term loans for educational purposes.	9,033 83
WAGE LOAN FUND—Created in 1942 by the United States Government to be loaned to students who received need grants.	4,620 37

# DESCRIPTION OF ENDOWMENT FUNDS

August 31, 1957

## UNRESTRICTED FUNDS

ALLEN FUND—Bequest of George N. Allen, M.D., received in 1924, the income to be used as required	300.00
ALLEN FUND—Created by the Class of 1920, to be added to by succeeding graduates, the income to be used as required	732.00
ALLEN FUND—Created in 1920, to be added to by succeeding graduates, the income to be used as required	1,000.00
ALLEN FUND—Created in 1920, to be added to by succeeding graduates, the income to be used as required	250.00
ALLEN FUND—Created in 1920, to be added to by succeeding graduates, the income to be used as required	180,750.00
ALLEN FUND—Created in 1920, to be added to by succeeding graduates, the income to be used as required	22,401.97
ALLEN FUND—Created in 1920, to be added to by succeeding graduates, the income to be used as required	220,140.00
ALLEN FUND—Created in 1920, to be added to by succeeding graduates, the income to be used as required	41,800.00
ALLEN FUND—Created in 1920, to be added to by succeeding graduates, the income to be used as required	1,000.00
ALLEN FUND—Created in 1920, to be added to by succeeding graduates, the income to be used as required	2,000.00
ALLEN FUND—Created in 1920, to be added to by succeeding graduates, the income to be used as required	33,210.00
ALLEN FUND—Created in 1920, to be added to by succeeding graduates, the income to be used as required	1,000.00
ALLEN FUND—Created in 1920, to be added to by succeeding graduates, the income to be used as required	19,220.00
ALLEN FUND—Created in 1920, to be added to by succeeding graduates, the income to be used as required	1,000.00

DESCRIPTION OF ENDOWMENT FUNDS (Continued)

August 31, 1952

UNRESTRICTED FUNDS (Continued)

Remuneration Fund—Created by Mary M. Readable in 1945 in memory of her husband, Luther H. Readable, after the income to be used as required.	15,000.00
River Basin Foundation Fund—Created by the River Basin Foundation, the income to be used as required.	1,000.00
Savings Endowment Fund—Created by J. Sanders in 1945, the income to be used as required.	2,110.00
Snyder's Fund—Bequest of John Madison Snyder, received in 1951, the income to be used as required.	5,000.00
Southern Cross Fund—Created by various donors during the years 1845-51, the income to be used as required. (Formerly called the <i>Pioneer Endowment Fund</i> ).	12,530.00
Sixth Fund—Bequest of Samuel Sykes in 1891, the income to be used as required.	1,500.00
Tuition Fund—Created in 1909 by bequest of John D. Feller and added to by Mary L. Feller, the income to be used as required.	157,980.00
Two-sires Fund—Created by the Board of Trustees of the University in 1912, the income to be used as required.	1,570.00
Wadson Fund—Created in 1954 by John E. Wadsh, the income to be used as required.	100.00
Warner Fund—Created in 1948 by bequests of Alexander W. Wadhall and Virginia Chase Wadhall, the income to be used as required.	10,000.00
Widener Memorial Fund—Gift of the Widener Association in 1950, the income to be used as required.	1,000.00
Wyandottah Fund—Gift of John Wyandottah and other donors during the years 1851-70, the income to be used as required. (Formerly called the <i>Ferry Personal Study Endowment Fund</i> ).	26,900.00
Wyandottah Fund—Bequest of Miss Susan W. Wyandottah, received in 1946, the income to be used as required.	50,000.00



# FELLOWSHIP FUNDS

Reverend Professor Fund—Created in 1928 by bequest of Herbert A. Adams, the income to be used for a fellowship in physics.	75,350.00
Mary F. Adams Fund—Bequest of Mary Adams, created in 1954, the income to be used for fellowships in medicine for the study of cardiovascular disease.	55,310.00
Savoy Foundation Fund—Bequest of Adèle Savoy in 1928 in memory of her brother, Thomas Bradford Sanders, the income to be used for fellowships in various disciplines fields of study.	210,404.46

## PROFESSORSHIP FUNDS

Alumni Professorship Fund—Gifts of various alumni since 1911, the income to be used for an alumni professorship in mathematics.	830.00
Carruth Professorship Fund—Created by Mary A. Sharpe in 1928 in memory of Mitchell Carruth, the income to be used for a chair in archaeology.	500.00
Congressional Representative Fund—Created in 1892 by gift of the United States of America by Act of Congress, the income to be used for professorships.	158,710.00
Dorsey Center in Primal Sciences Fund—Created by Mary Dorsey in 1946, the income to be used for a course in the history of the Chemistry of Organic Compounds in Physics.	170,000.00
Edison Professorship Fund—Bequest of Benjamin Edison, created in 1872, the income to be used for a professorship in the field of the Law, Philosophy of Natural and Moral Philosophy.	14,510.00
Ford Foundation Professorship Fund—Created in 1956 by the Ford Foundation, the income to be used to provide faculty salaries. About ten years, the principal sum may be used for other salary but not for other salary.	776,000.00
Fay Professorship Fund—Bequest of Annabel Lee Fay, received in 1945, in memory of her husband, Dr. Henry D. Fay, the income to be used for a professorship in physics.	106,097.98
Created in 1945 from income of the original fund, the income of the two funds to be used for a professorship in physiology.	42,918.00
Younis Fund—Bequest of Nazim Younis Nabil in 1929 in memory of her mother, Nancy Younis, the income to be used for lectures in home economics.	5,000.00

## DESCRIPTION OF ENDOWMENT FUNDS (Continued)

August 31, 1957

### SCHOOL FUNDS

#### ENGINEERING

HOWARD LECTURE FUND—Created in 1952 by Frank A. Howard, the income to be used for lectures on engineering . . . . . 3,620.00

SCHOOL OF ENGINEERING FUND—Created in 1934, the income to be used for the School of Engineering . . . . . 800.00

#### GOVERNMENT

BARRIS FUND—Bequest of John G. Barris, received in 1951, the income to be used for the School of Government . . . . . 279,710.00

SCHWARTZ RISE FUND—Created in 1948 by the Supreme Council of the Ancient and Accepted Scottish Rite of Freemasonry of the Southern Jurisdiction of the United States of America, the income to be used for George Washington, the income to be used for the School of Government . . . . . 1,000,000.00

#### LAW

ALPHEA FUND—Gift of Bertha F. M. Alizer in 1954, in memory of P. J. Altizer, the income to be used for the Law School . . . . . 1,000.00

CUMMINGS FUND—Bequest of Homer S. Cummings in 1957, in memory of Julia M. Cummings, the income to be used for the Law School . . . . . 15,000.56

#### MEDICAL

BARTSCH-DUNNE RESEARCH FUND—Created in 1952 by Dr. Anna Bartsch-Dunne from income of the Bartsch-Scholarship Fund, the income to be used for medical research . . . . . 4,547.00

BORDEN MEMORIAL FUND—Created in 1936 by Dr. Daniel L. Borden and Jennie Ella Borden, in memory of William C. Borden, the income to be used for the School of Medicine . . . . . 3,710.00

COLLINS MEMORIAL RESEARCH FUND—Created in 1946 by various donors in memory of Dr. James Lloyd Collins, the income to be used for medical research . . . . . 2,830.00

COOPER MEMORIAL RESEARCH FUND—Bequest of William J. Cooper in 1905, the income to be used by the Southern Medical Research Fund, the income to be used for medical research . . . . . 10,000.00

COURT OF D. C. as follows: the income to be used toward the establishment and maintenance of a collection of the Southern Jurisdiction of the United States of America, the work of this laboratory to be used for the study of the nature, transmission, prevention, and cure of malaria and other infectious diseases . . . . . 10,000.00

CHARLES F. S. — Bequest of John M. Cummings in 1957, the income to be used for the purchase and maintenance of carriages for the school library.	10,000.00
FORD, MARY AT SUMMIT FUND — Bequest of Mary A. Fajby in 1951, the income to be used for either purchase by the School of Medicine.	1,000.00
FORD, MARY AT SUMMIT FUND — Bequest of Mary A. Fajby in 1951, the income to be used for the purchase of books for the School of Medicine.	2,000.000.00
GARDNER, MARY AT SUMMIT FUND — Bequest of William D. Gardner in 1928, the income to be used for the School of Medicine.	4,400.00
GARDNER, MARY AT SUMMIT FUND — Bequest of William D. Gardner in 1928, the income to be used for the School of Medicine.	44,880.00
GARDNER, MARY AT SUMMIT FUND — Bequest of William D. Gardner in 1928, the income to be used for the School of Medicine.	265,407.26
GARDNER, MARY AT SUMMIT FUND — Bequest of William D. Gardner in 1928, the income to be used for the School of Medicine.	27,400.00
GARDNER, MARY AT SUMMIT FUND — Bequest of William D. Gardner in 1928, the income to be used for the School of Medicine.	13,961.00
GARDNER, MARY AT SUMMIT FUND — Bequest of William D. Gardner in 1928, the income to be used for the School of Medicine.	8,216.79

PHARMACY

GRAND PHARMACY FUND — Created by M. G. Collins in 1977, the income to be used to aid in establishing and maintaining a commercial pharmacy center in connection with the School of Pharmacy.	10,000.00
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# DESCRIPTION OF ENDOWMENT FUNDS (Continued)

August 31, 1957

## CANCER CLINIC FUNDS

557.00

CANCER CLINIC FUND—Created in 1951 by Mr. and Mrs. V. A. Klen, the income to be used for the Cancer Clinic.

29,151.08

CANCER CLINIC FUND—Bequest of Beatrice E. Sanders in 1951, the income to be used for the Cancer Clinic.

## HOSPITAL FUNDS

1,230.00

CHAPMAN HOSPITAL FUND—Bequest of Mrs. Sarah A. Chapman in 1911, the income to be used for the purposes of the hospital.

1,000.00

CHAPMAN HOSPITAL FUND—Gift in 1951 of Washington Maternity of Zeta Tau Alpha Sorority, in memory of Beatrice A. Chapman, the income to be used for the hospital.

1,445.00

GENERAL HOSPITAL FUND—Created in 1929 by various donors, the income to be used for the hospital.

87,440.00

HUGHES HOSPITAL FUND—Bequest of Della Hark in 1955, the income to be used for the hospital.

2,500.00

HUGHES HOSPITAL FUND—Bequest of E. Edgar Hughes, created in 1944, the income to be used to endow a room in memory of his daughter, Anna Victoria Hughes.

1,000.00

KARLSTADT HOSPITAL FUND—Gift of Samuel H. Karlstad in 1954, the income to be used for the hospital.

3,080.00

KARLSTADT HOSPITAL FUND—Bequest of Anna Karstad, created in 1932, the income to be used for the hospital.

KARLSTADT HOSPITAL FUND—Bequest of Freda Karlstad, created in 1930, the income to be added to the principal of the fund to keep enough to maintain a bed in the White Ward of the hospital.

1,732.00

KARLSTADT HOSPITAL FUND—Bequest of Freda Karlstad, created in 1930, the income to be added to the principal of the fund to keep enough to maintain a bed in the White Ward of the hospital.

Fred Karlstad



MALONEY HOSPITAL FUND—Created in 1952 by the Maloney Concrete Co., the income to be used for the hospital.	5,000.00
NATIONAL PARK SEMINARY HOSPITAL FUND—Gift of students of National Park Seminary of Forest Glen, Maryland, in 1906, the income to be used toward the maintenance of a bed in the hospital.	500.00
PAYSON VAN HANDEL FUND—Created in 1936 by an anonymous donor, the income to be used to provide hospital care for the daily treatment of blind persons, especially heart disease.	100,170.00
REINHARDT HOSPITAL FUND—Bequest of Laura Wynne Reinhardt in 1922, the income to be used for the hospital.	500.00
STIGSON HOSPITAL FUND—Gift of income of Harry M. Stigson in 1952, the income to be used for the hospital.	15,000.00
TATE HOSPITAL FUND—Created in 1911 by bequest of Lambert M. Tate, in memory of his mother, Mrs. Laura M. Tate, the income to be used for maintenance of a bed in the hospital, to be known as the "Laura M. Tate Bed."	10,000.00
WOMEN'S BOARD OF THE HOSPITAL	
BAKER HOSPITAL FUND—Created by Grace C. Barton in 1950, the income to be used for medicine for indigent patients.	9,500.00
WINDSOR HOSPITAL FUND—Bequest of Ellen DeQ. Woodbury in 1909, the income to be used for the hospital and treatment of kidney patients in the hospital.	10,000.00

# MUTUAL EQUIPMENT FUND

WOMAN'S BOARD HOSPITAL EQUIPMENT FUND—Created in 1954 by the Women's Board of the Hospital, the income to be used for the purchase of equipment.	36,519.40
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# DESCRIPTION OF ENDOWMENT FUNDS

August 31, 1927

## PLANT FUNDS

CHURCH FUND—Gift of the City of 1926 to be used for the acquisition of books, erection of building and other improvements for the purpose of expanding the library. This fund was \$50,000 when received and is now \$14,926.00.	14,926.00
NATIONAL UNIVERSITY LIBRARY FUND—Created in 1955 by transfer of the assets of National University. This fund is now \$18,800.00.	18,800.00
LIBRARY BOOK FUND—Created in 1921 by the National University Law School. This fund is now \$1,520.00.	1,520.00

## LIBRARY BOOK FUNDS

CHURCH FUND—Gift of F. H. S. Childs in 1951, the income to be used to purchase books for the Library.	175.00
LIBRARY BOOK FUND—Created in 1951 by D. C. Masonic Club and added in 1957 by transfer of F. H. S. Childs. This fund is now \$500.00.	500.00
LIBRARY BOOK FUND—Gift of Captain Deane Childs Howard in 1943 in memory of Captain Deane Childs Howard. This fund is now \$10,000.00.	10,000.00
LIBRARY BOOK FUND—Gift of Eugene Meyer in 1944, the income to be used to purchase books for the Library. This fund is now \$1,000.00.	1,000.00
LIBRARY BOOK FUND—Gift of W. N. Meyer in 1947, the income to be used to purchase books for the Library. This fund is now \$10,000.00.	10,000.00

LIBRARY BOOK FUND—Gift of Dr. Charles (now deceased) in 1941, the income to be used to purchase books for the Library. This fund is now \$10,000.00.

SCHOLARSHIP FUNDS

ASIANIC MEMORIAL SCHOLARSHIP FUND—Gift of Belle Park Avenue in 1920 in memory of her husband, Byron Andrew, the first to be sent for scholarships for education and study of English, Latin, mathematics, history, literature, or political science.	5,194 95
BARTON SCHOLARSHIP FUND—Granted by Dr. Anna Bartack Dorem in 1949, the income to be used for a scholarship for a woman in the School of Medicine and an internship for a woman in the University Hospital.	20,040 00
BRADLEY SCHOLARSHIP FUND—Donated by Alice Bradley in 1954 in memory of Everett Leonard Bradley, the income to be used for a scholarship in the School of Medicine.	2,760 00
CAPPE SCHOLARSHIP FUND—Granted by the family of Emma K. Cappe in 1912, the income to be used for scholarships for young white men.	48,610 00
CARTER, H. H. SCHOLARSHIP FUND—Gift of Maria M. Carter in 1896 in memory of her husband, Henry Harrison Carter, the income to be used for scholarships in classics, science.	5,000 00
CARTER, M. M. SCHOLARSHIP FUND—Gift of Maria M. Carter in 1871, the income to be used for scholarships for young men.	1,000 00

# DESCRIPTION OF ENDOWMENT FUNDS (Continued)

August 31, 1957

## SCHOLARSHIP FUNDS (Continued)

### COLUMBIAN WOMEN SCHOLARSHIP FUND

BROWN SCHOLARSHIP FUND—Created by the College Women's Club of Washington, D. C., in 1925, in memory of Elizabeth V. Brown, the income to be used for scholarships in the School of Education	1,200.00
COLUMBIAN SCHOLARSHIP FUND—Created by the Columbian Women of The George Washington University in 1911 in memory of Grace Ross Columbian, the income to be used for scholarships for young women	2,300.00
COLUMBIAN WOMEN'S SCHOLARSHIP FUND—Gift of the College Women's Club of Washington, D. C., in 1926, the income to be used for scholarships	500.00
FUND FOR COLUMBIAN WOMEN SCHOLARSHIP FUND—Created by the Columbian Women of The George Washington University in 1920, the income to be used for scholarships for women in Columbian College	5,000.00
HARRY FOUNDATION SCHOLARSHIP FUND—Created in 1957 by gift of Rose Lee Hardy Foundation, the income to be used for scholarships	2,000.00
HARRIS SCHOLARSHIP FUND—Created by the Columbian Women of The George Washington University in 1925 in memory of Lillian Young Harris, the income to be used for scholarships for women in Columbian College	5,000.00
KNAPP SCHOLARSHIP FUND—Gift of the Columbian Women of The George Washington University in 1913 in memory of Nellie Maynard Knapp, the income to be used for scholarships for women	5,000.00
MC WILLIAM SCHOLARSHIP FUND—Bequest of Janet McWilliam, former president of Columbian Women, to the Columbian Women of The George Washington University, transferred to The University in 1953, the income to be used for scholarships	1,000.00
WILLIAM SCHOLARSHIP FUND—Gift of The George Washington University in 1953 in memory of her parents, Louise D. and Martin H. Williams, the income to be used for scholarships in the School of Education	1,000.00



DAVIS SCHOLARSHIP FUND—Gift of Isaac Davis in 1872, the income to be used for scholarships.	1,000 00
D C—D. A. R. SCHOLARSHIP FUND—Created by 1952 by the D C—D. A. R., the income to be used for scholarships for descendants of patriots of the American Revolution.	8,230 00
DORSEY SCHOLARSHIP FUND—Created in 1947 by Harriman Dorsey in memory of Charles Worthington Dorsey, the income to be used for scholarships.	12,940 00
ERWIN SCHOLARSHIP FUND—Gift of Hobbs B. Erwin in 1955 in memory of Henry Parsons Erwin, the income to be used for a scholarship in the School of Engineering.	5,000 00
FARSHAW SCHOLARSHIP FUND—Gift of Mrs. Robert Farshaw in 1871, the income to be used for scholarships in Columbian College.	1,000 00
FISHER SCHOLARSHIP FUND—Bequest of Luther Brigham Fisher in 1951, the income to be used for scholarships.	1,000 00
HANCOCK SCHOLARSHIP FUND—Gift of Joseph Hancock Young in 1948 in memory of her mother, Anne Spaulding Hancock, the income to be used for scholarships for married women in the School of Education or Columbian College.	500 00
HARVEY SCHOLARSHIP FUND—Bequest of Emma Elizabeth Harvey in 1921, in memory of her husband, John Harvey, the income to be used for scholarships in Columbian College for young women of the Presbyterian faith, held by the Association (1951).	4,650 00
HAZLETON SCHOLARSHIP FUND—Bequest of Elizabeth Hazleton in 1950, the income to be used for scholarships.	5,000 00
KESWICK SCHOLARSHIP FUND—Gift of Anne Paulding in 1879, the income to be used for scholarships designated by the Board of Trustees as one of the two High School Scholarships assigned to Western High School.	5,960 00

# DESCRIPTION OF ENDOWMENT FUNDS (Continued)

August 31, 1957

## SCHOLARSHIP FUNDS (Continued)

MORTIMER SCHOLARSHIP FUND—Created by A. Mortimer in 1861, the income to be used for scholarships for undergraduates intending to enter the Christian ministry.	1,500.00
PHARMACY SCHOLARSHIP FUND—Bequest of Paul Pearson in 1944, the income to be used for scholarships in the School of Pharmacy.	2,840.00
PHI DELTA DELTA FRATERNITY SCHOLARSHIP FUND—Created by Phi Delta Delta Fraternity in 1957, the income to be used for a scholarship for a woman student in the first year law class.	1,000.00
POWELL SCHOLARSHIP FUND—Created by Lewis M. Powell in 1880, the income to be used to train young men for service in the United States Naval Academy or to fit them to become officers and masters in the Merchant Marine Service of the United States.	50,000.00
SHAW SCHOLARSHIP FUND—Bequest of John M. Shaw in 1846, the income to be used for scholarships in the School of Government.	10,000.00
SPENCER SCHOLARSHIP FUND—Created by Emma J. Spencer in 1918, the income to be used for scholarships.	7,422.20
STONE SCHOLARSHIP FUND—An endowment gift in 1931 in memory of Mary Lowell Stone, the income to be used for scholarships for women students in the Graduate College.	2,000.00
SWANSON SCHOLARSHIP FUND—Created by Dr. Charles C. Swanson in 1941, the income to be used toward scholarships by Methodist Home.	15,193.00
WATSON SCHOLARSHIP FUND—Gift of William Watson in 1824, the income to be used for scholarships for undergraduates intending to enter the Christian ministry.	2,500.00
WILLIAMSON SCHOLARSHIP FUND—Gift of the New York Baptist Theological Seminary in 1830, on behalf of John Williamson, the income to be used for scholarships.	1,900.00
WILSON SCHOLARSHIP FUND—Bequest of Eben M. F. Wilson in 1921, the income to be used for scholarships in the Graduate College.	600.00

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# PRIZE FUNDS

BENSON MEMORIAL AWARD FUND—Gift of Patricia Benson in 1937 in memory of her son, Byron Tierrell Benson, the income to be used for an annual award in chemistry.	1,000.00
CHARLES PRIZE FUND—Created in 1943 by John Henry Charles, the income to be used for annual awards in the School of Government.	3,000.00
COLEMAN PRIZE AWARD—Bequest of Dr. Wm. Coleman Grossman in 1941, the income to be used to award an annual prize for excellence in dramatic or dramatic literature.	1,000.00
CURRIEN PRIZE FUND—Gift of Martin Kendall Currier in 1902, in memory of E. K. Currier, the income to be used for an annual award for excellence in the study of English.	1,000.00
DAVIS PRIZE FUND—Gift of Irene Davis in 1947, the income to be used for an annual award for members of the senior class who have made the greatest progress in connection with the University.	700.00
ELABAY PRIZE FUND—Gift of Helen Elabay Murphy in 1948 in memory of her late husband, John Frederick Essary, the income to be used for an annual award in geology.	3,000.00
EVANS MEMORIAL AWARD FUND—Created in 1917 by friends of Joshua Evans III, the income to be used to establish a prize for excellence in mathematics and in the award annually to the student in the graduating class who has demonstrated the highest ability in the study of physical sciences and who has given promise of the interpretation of that study in good citizenship during his lifetime.	1,500.00
FISKE PRIZE FUND—Gift of James F. Fiske in 1908 in memory of William B. Fiske, the income to be used for an annual award to a senior student for the best general examination in chemistry.	1,000.00
GROSVEN PRIZE FUND—Created in 1957 by Charles C. Grosven, Jr., in memory of his great grandfather, Charles Grosven, the income to be used for an annual award to the student in the Law School who has attained the highest average grade in the third year, law three course.	2,000.00

# DESCRIPTION OF ENDOWMENT FUNDS (Continued)

August 31, 1957

## PRIZE FUNDS (Continued)

CONYNGHAM PRIZE FUND—Gifts of Mary W. Conyngham, Alice Douglas Goddard, and Frederick J. Goddard, in 1923, in memory of Morgan Richardson Goddard. Edward Carrington Goddard, and James Douglas Goddard; added to in 1941 by a gift of Frederick J. Goddard in memory of Alice Douglas Goddard. The income shall be used to award four cash prizes annually to the students making the highest averages in commerce, French language and literature, pharmacy, and American literature, respectively.	5,520.00
HUBBARD PRIZE FUND—Gift of Gertrude M. Hubbard in 1907 in memory of her husband, Gardiner G. Hubbard, the income to be used for an annual award for excellence in American history.	1,000.00
LARNER PRIZE FUND—Request of John B. Larner in 1933, the income to be used for an annual award in the Law School.	800.00
MAHLER PRIZE FUND—Gift of Martin Mahler in 1935, the income to be used for the "Martin Mahler Prize in Mathematics Testing".	100.00
ORDONNAUX PRIZE FUND—Bequest of John Ordonnaux in 1909, the income to be used for annual awards in the Law and Medical Schools.	5,000.00
ROBERTS PRIZE FUND—Gift of William Roberts in 1859, the income to be used for an annual award for excellence in mathematics.	500.00
STAGHTON-ELTON PRIZE FUND—Created by gift of Romeo Elton of Exeter, England, in 1800, the income to be used for annual awards for excellence in the Latin and Greek languages, one to be called the Staughton Prize in Latin, the other the Elton Prize in Greek.	500.00



STURGEON PRIZE FUND—Gift of the Reverend J. MacPhee-Smyth in 1911 in memory of his son, I. MacPhee-Smyth, Jr., the income to be used for books to be awarded annually to the student obtaining the highest average in general physics	500 00
SWISSER PRIZE FUND—Gift of Charles Clayton Swisher in 1941, the income to be applied yearly to enlarging the sum set apart for the Historical Prize established in his name by the Historical Club, December 7, 1936	1,000 00
WALSH PRIZE FUND—Gift of Thomas F. Walsh in 1901, the income to be used for an annual award for the best essay on some topic in Irish history	1,000 00
WELSH PRIZE FUND—Gift of Virginia Chase Weddell in 1923, the income to be used to award annually the Alexander Willbourn Weddell Prize to the student submitting the best essay upon the general subject of the promotion of peace among the nations of the world	5,000 00

#### RESERVE FOR PROTECTION OF INVESTMENTS OF ENDOWMENT FUNDS

RESERVE FOR PROTECTION OF CONSOLIDATED ENDOWMENT FUNDS INVESTMENTS—Created from gains arising from the sale of investments and a portion of the net income of Consolidated Endowment Funds Investments	100,117.74
RESERVE FOR PROTECTION OF SCOTTISH RITE ENDOWMENT FUNDS INVESTMENTS—Created from gains arising from the sale of Scottish Rite Investments	62,706.80

# DESCRIPTION OF PLANT FUNDS

August 31, 1957

1,240.00

Fifth House Fund—Created by the Class of 1940 to assist in building a new house

231,219.05

Ford Foundation Hospital Building Fund—Gift of the Ford Foundation for additional Hospital construction....

437.31  
2,379.34  
406.79  
19.91  
44.00  
915.79  
184.02  
102.91  
237.42

Hospital Equipment Fund—

Cancer Clinic—Beta Gamma Phi Sorority.....

Cancer Clinic—Squad.....

Cancer Clinic—Zito.....

Cardiovascular Department.....

Medical Sciences.....

Chemistry and Cytopathology.....

Physical Medicine.....

Preventive Medicine.....

Women's Board Gift Shop.....

Law Center Fund—Created in 1945 by various donors, to be used for the acquisition of land and the erection of a building for the Law School

130,095.72

Library Book Funds—Gifts of Various Donors

American Pharmaceutical Library Fund

Brunswick Medical Club Library Fund

Quincy, Rhode Island, Library Fund

CLASS OF 1945 Library Fund

Created

1950 46.00  
1950 430.50  
1951 50.00  
1945 58.75

GRANT OF RESEARCH (QUARTERLY) LIBRARY FUND	1943	110.56
HILLMAN SOCIETY LIBRARY FUND	1945	225.00
MURPHY LYNCH, PHILIP, LIBRARY AND BOOKS LIBRARY FUND	1945	970.84
NOYES, FRANKLIN W., LIBRARY FUND	1947	2,564.60
PHI ALPHA DELTA LIBRARY FUND	1946	19.61
ROBERTS LIBRARY FUND	1948	127.47
MARION M. BEAN AND MARY A. WOOD MEMORIAL FUND—Anonymous gift in 1953 to create a room for meditation and prayer in the Warwick Memorial Building		2,000.00
PAINE FUND—Created in 1941 by Richard E. Paine, by devise and bequest, to be used for athletics		101,568.41
SCHOOL OF MEDICINE BUILDING FUND—Created in 1945 by various donors, to be used toward the erection of a School of Medicine Building, etc.		7,486.50
WOMEN'S ACTIVITIES BUILDING FUND—Created in 1949 by various donors to erect a women's activities building		6,265.60

# FORMS FOR BEQUESTS

To all persons of the University who wish to make provision in their wills for the increasing needs of the University, the following bequests are suggested:

"I give and bequeath to the Trustees of The George Washington University, a corporation chartered by Act of Congress, and located at Washington, D. C.

Dollars."

(1) (Unrestricted)  
"for the good of the benefit of The George Washington University in such manner as the Trustees thereof may direct."

or (2) (Partially Restricted Income unrestricted)

"as estate or income fund to be known as the

Fund, such fund to be kept invested by the Trustees of The George Washington University and the annual income thereof used for the benefit of the University in such manner as the Trustees thereof may direct."

or (3) (Specimen Purpose)

"to be used for the following purposes" (here specify in detail the purposes):



SUMMARIES OF  
DOCTORAL DISSERTATIONS

1957



THE  
GEORGE  
WASHINGTON  
UNIVERSITY  
BULLETIN

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VOL. LVII

No. 3

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SUMMARIES OF  
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1957

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WASHINGTON 6, D. C.

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### PREFATORY NOTE

This number of the University BULLETIN contains summaries of the dissertations which have been accepted during 1957, in partial satisfaction of the requirements for the degrees of Doctor of Philosophy, Doctor of Juridical Science, and Doctor of Education at The George Washington University.

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SUMMARIES OF DISSERTATIONS  
SUBMITTED FOR  
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# FURTHER APPLICATIONS OF INFORMATION THEORY TO MULTIVARIATE ANALYSIS AND STATISTICAL INFERENCE

by MORTON KUPPERMAN†

A generalized "distance" statistic,  $I^*$ , based on the Kullback-Leibler measure of information I(1.2), is defined for the purpose of testing the null hypothesis that an observed sample of  $n$  independent observations came from a specified general multivariate multiparameter population (not necessarily normal). The statistic is

$$I^* = \left[ \int f(x, \hat{\theta}) \log \frac{f(x, \hat{\theta})}{f(x, \theta_0)} dx(x) \right]_{\hat{\theta} = \hat{\theta}^*}, \text{ where the population is}$$

given by  $f(x, \theta)$ ,  $x$  and  $\theta$  being vectors. The random vector  $\hat{\theta}^*$  is any consistent, asymptotically multivariate normal, efficient estimator of  $\theta$ ; the vector  $\theta_0$  is the value of  $\theta$  specified by the null hypothesis. It is proved that  $2nI^*$  is asymptotically distributed as chi square with  $h$  degrees of freedom ( $h$  being the number of parameters) when the null hypothesis is true. The only previous results along this line are due to Kullback and Hovt, who considered the special case of the multivariate normal distribution and maximum likelihood estimators. A corresponding result is obtained for the asymptotic distribution of a divergence statistic based on the Kullback-Leibler divergence I(1.2). Results are derived for asymptotic sampling distributions of information-statistics and divergence-statistics calculated from several samples.

The definition of the information statistic for several samples is modified to cover the case when the null hypothesis states that the samples ( $r$  in number) all came from the same population whose functional form is known but whose parameters are all unknown and unspecified. It is proved that if  $\hat{\theta}_r^*, r = 1, 2, \dots, t$ , is a consistent, asymptotically multivariate normal, efficient estimator of the unknown set of  $h$  parameters  $\theta$ , for the  $r$ th sample in  $t$  independent samples ( $t \geq 2$ ), of  $n_r$  independent observations each, drawn from the population given by  $f(x, \theta)$ , and if  $\hat{\theta}^*$  is the weighted average of the  $\hat{\theta}_r^*$  (the weights being  $n_r$ ), then the information statistic

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$$2 \sum_{i=1}^r n_i I_i^* = 2 \sum_{i=1}^r n \left[ \int i(x, \theta) \log \frac{i(x, \theta)}{i(x, \theta_0)} d\lambda(x) \right] \\ \theta = \theta^* \\ \theta_0 = \theta^*$$

is asymptotically distributed as chi-square with  $(r-1)h$  degrees of freedom when the  $r$  independent samples are actually from the same population whose unknown parameters  $\theta_0$  are estimated by the  $\theta^*$ . Thus we have available a general large-sample test for homogeneity of population parameters for several samples. In the special case of two samples a divergence statistic is defined to test the same null hypothesis; its asymptotic distribution is that of chi-square with  $h$  degrees of freedom.

The distributions of information statistics and divergence statistics are considered in the case when the null hypothesis is not true. Asymptotically these statistics have no limit-distribution and converge in probability to an indefinitely large number. However, the large sample distribution may be approximated by a distribution related to the noncentral chi-square distribution with a large noncentrality parameter and the same number of degrees of freedom as when the null hypothesis is true.

The preceding results are applicable to all multivariate multiparameter statistical populations for which the measure of information  $I(1;2)$  or divergence  $J(1,2)$  are definable. Most of the remainder of the dissertation is concerned with a special, but most important, subclass of the class of all statistical populations—the exponential class of distributions defined by

$$i(x, \theta) = q(\theta) r(x) e^{\sum_{j=1}^m c_j(\theta) t_j(x)}$$

where  $x$  and  $\theta$  are vectors. When  $m \leq h$ , where  $h$  is the number of parameters, we have the class of distributions that admit of sufficient estimators for the parameters  $\theta$ . Most of the results pertain to this latter class, which includes most of the familiar distributions of statistics. Simplified formulas are given for finding  $I(1;2)$  and  $J(1,2)$  for distributions belonging to the exponential class of distributions.

An important result derived for the class of multivariate multiparameter distributions admitting sufficient statistics is that the negative of the logarithm of the likelihood-ratio criterion for testing the null hypothesis that  $r$  independent samples all came from the same population is equal to the information statistic using maximum likelihood estimators for the  $r$  samples. In symbols,  $-\log \lambda = \hat{I}$ , where  $\lambda$  is the likelihood-ratio criterion and  $\hat{I}$  is  $n$  times the information-statistic in which maxi-

maximum-likelihood estimators are used as the consistent, asymptotically multivariate normal, efficient estimators ( $n$  is the sample size). Since  $-2 \log \lambda$  was proved by Wilks to be distributed asymptotically as chi-square when the null hypothesis is true, we have an alternative proof of the asymptotic distribution of  $2nI^*$  when the vector  $\theta^*$  is the set of maximum-likelihood estimators and the distribution is of the form admitting sufficient statistics.

A byproduct of the proof of the result  $-\log \lambda = \hat{I}$  leads to a simplified method of calculating maximum likelihood estimators for the class of distributions admitting sufficient statistics. The basic formulas are

$$\left[ E_{\theta} \left\{ t_i(x) \right\} \right]_{\theta=\hat{\theta}} = \frac{1}{n} \sum_{j=1}^n t_i(X_j), \quad i=1, 2, \dots, h.$$

The close relationship of information to sufficient estimators is shown by proving that a necessary and sufficient condition that

$$\frac{1}{n} \sum_{a=1}^n \log \frac{f(X_a, \theta^*)}{f(X_a, \hat{\theta})} = \int f(x, \theta^*) \log \frac{f(x, \theta^*)}{f(x, \hat{\theta})} d\lambda(x)$$

be true for all values of the single unknown parameter  $\theta$  (with the estimator  $\hat{\theta}$  independent of  $\theta$ ) is that the multivariate uniparameter distribution given by  $f(x, \theta)$  belong to the class of distributions admitting sufficient statistics and that  $\hat{\theta}$  be the maximum-likelihood estimator of  $\theta$  (and therefore  $\hat{\theta}$  is a sufficient statistic). The quantity on the left-hand side of the identity is termed average sample information and the quantity on the right is the information-statistic.

Various applications of the concept of information are made to statistical inference. A principle is set forth, applicable to the general statistical population, designated the "Information Discrimination Principle", which states that a given simple null hypothesis is to be rejected when the discrimination information provided by a sample and a method of estimation against the null hypothesis is significantly greater than the discrimination information provided by the same sample and the same method of estimation against the simple alternative hypothesis.

Applications of this principle are made to testing simple null hypotheses against simple alternatives. The familiar tests are found and for the class of distributions admitting sufficient statistics we obtain best critical regions and at times uniformly most powerful tests. An application is also made to testing composite hypotheses. The information theory approach to statistical inference is applied to: (1) probabilities of hypotheses using Bayes' theorem; (2) test of a simple null hypothesis in



the sense of R. A. Fisher; (3) Neyman-Pearson theory of hypothesis testing; and (4) sequential analysis.

Karl Pearson's classic chi-square test of goodness of fit is derived by an approach using information theory. The familiar result is obtained.

Information theory is applied to derive the exact sampling distribution of sufficient statistics. Although the results derived are not new, the approach by using information theory is. In particular, a new and simplified derivation of the Wishart distribution is given.

Finally, it is shown that the set of sufficient estimators of the population parameters appearing explicitly in any distribution belonging to the class of distributions admitting sufficient statistics are distributed jointly in a distribution also belonging to the class of distributions admitting sufficient statistics. (The functional forms of the two distributions need not be the same.) It is then conjectured that the estimate of the generalized variance (as originally defined by Wilks) in sampling from a multivariate normal population is distributed in a simple distribution belonging to the class of distributions admitting sufficient statistics.



## SOCIOMETRIC FACTORS IN EMPLOYEE ABSENTEEISM, ACCIDENT-PRONENESS, AND ALCOHOLISM

BY ARTHUR RUFUS LANEY, JR.\*

The primary purpose of this research was to determine how sociometric status (i. e., one's popularity with and influence on one's fellow workers) compares with certain other factors in degree of relationship to absenteeism, accident-proneness, and alcoholism among employees of a public utility company. The other factors used as independent variables were age, experience, intrinsic job satisfaction, and psychological test scores (which were available on some but not all of the workers). The tests were designed to measure mental ability, job aptitudes, personality type, and emotional stability.

For reasons of validity and reliability the study was confined to work groups which met these three requirements:

1. Employees work in close proximity
2. Approximate equality in job status
3. Stability of personnel

Three white collar groups (totalling 112 employees) and two blue-collar groups (containing a total of 53 employees) were found to meet these requirements. These cover a wide range of occupational pursuits since they include a group of 41 employees who contact the public over the telephone on a full-time basis, a group of 32 male clerical employees, a group of 39 draftsmen, and two groups of blue-collar workers—one of which is virtually on an assembly-line and the other is comprised of tool and equipment maintenance workers.

Preliminary study of one of the criteria; namely, frequency of absence, showed that its reliability was satisfactory provided a four-year base period was used. Therefore, each employee's 1952-1953 absence record was compared with that for 1954-1955 (except in a few cases where the employee had a lesser degree of company seniority) and the reliability coefficients for the five groups thus derived ranged from .45 to .85, the average being .55.

Only the two blue-collar groups had sufficient personal injury accidents to permit investigation. Here each employee's record for the first half of his total company service was compared with his performance for the second half. The reliability coefficients which resulted were .36 for the assembly-line workers and .75 for the maintenance mechanics.

Seven workers in the five work groups are regarded by their super-

\* A.P. 1:47 AM 1959. The George Washington University. Ph.D. candidate February 22, 1957. *Undergraduate in charge of research*. Thomas H. Jones, *Professor of Psychology*.

visors as problem drinkers; i. e., employees whose continued overindulgence interferes with the efficient performance of their work.

Individual study cards were prepared for each worker showing his age, experience, and, in most cases, psychological test scores.

Each employee was rated on his over-all job proficiency by the two supervisors most familiar with his work. The reliability coefficients for these two sets of independent ratings in each of the five work groups ranged from .40 to .86, the average being .70. (The reason for the .40 was a heavy seniority bias by one of the raters of the Service clerks.)

The supervisors were also asked to give their explanations as to why certain employees were absent so frequently. In four cases—three telephone room employees and one Service clerk, the supervisors regarded the high absence frequency to be unavoidable due to poor health. These cases were therefore not expected to correlate with any of the independent variables and were thus excluded from the statistical testing of the various hypotheses.

Intrinsic job satisfaction and sociometric status of each employee were derived through an individual interview with him. The employee was asked to respond to four of Morse's intrinsic job satisfaction multiple-choice questions\* and to two sociometric questions: "With whom in this group do you most enjoy working?" and "Who in this group do you think would make a good supervisor?"

Intrinsic job satisfaction scores were computed for each worker on the basis of the differential weightings assigned to the five possible replies to each of Morse's questions and his sociometric "popularity score" was determined by how many first, second, or third choices he received from other employees as their response to the first sociometric question above. Sociometric "influence scores" were similarly derived based on choices received from responses of fellow workers to the second sociometric question.

Product-moment intercorrelations were computed between the various factors used as predictors of absences, accidents, and alcoholism in each work group. The chi-square test, corrected for small samples where necessary, was used to evaluate the relative predictive strength of each factor.

The eight hypotheses tested and the experimental findings are as follows:

1. Workers in the upper fourth of the work groups in absence frequency do not differ significantly from the other employees on any of the nine variables studied.

Finding—Hypothesis rejected. Workers in the upper fourth of the work groups in absence frequency do differ significantly from the other

\* Morse, Nancy C. *Satisfactions in the White Collar Job*. Ann Arbor, Survey Research Center, U. of Mich., 1955.

employees in Age, Popularity, and, in the case of the blue-collar workers, Influence.

2. There is no configuration or pattern of individual scores on any two or more of the nine variables which consistently differentiates the workers in the upper fourth of the work groups in absence frequency from the other employees.

Finding—Hypothesis rejected. Combining Age with Popularity consistently differentiates the white-collar absentees, and combining Age with Influence provides a valid absenteeism predictor for blue-collar employees.

3. Workers in the upper fourth of the work groups in accident frequency do not differ significantly from the other employees on any of the nine variables studied.

Finding—Hypothesis sustained.

4. There is no configuration or pattern of individual scores on any two or more of the nine variables which consistently differentiates the workers in the upper fourth of the work groups in accident frequency from the other employees.

Finding—Hypothesis sustained.

5. Employees who are regarded by their supervisors as problem drinkers do not differ significantly from other workers on any of the nine variables studied.

Finding—Hypothesis rejected. White-collar employees who are regarded by supervisors as problem drinkers differ significantly from other workers on Popularity, Influence, and Supervisory Ratings.

6. Employees who are regarded by their supervisors as problem drinkers do not differ significantly from other workers on the pattern or configuration of their scores on any two or more of the nine variables.

Finding—Hypothesis rejected. The combination of Popularity, Influence, and Supervisory Ratings provides a valid predictor of problem drinking among white-collar employees in the very small experimental population available for study.

NOTE: Both Hypotheses 5 and 6 should be tested by further and more extensive research before acceptance of hypotheses that the converse is true.

7. Employees who nominate as their candidate for supervisor an individual who has a poor attendance record are not themselves absenteeism-prone.

Finding—Hypothesis sustained.

8. Employees who choose as their nominee for supervisor a man who has a poor safety record are not themselves above average in accident frequency.

Finding—Hypothesis sustained.

The findings relative to the sociometric status of employees who are



most frequently involved in accidents do not support the research conclusions of Speroff and Kerr\*.

Nor does it appear likely from these data that the blue-collar worker who indulges in alcoholic beverages to the extent that it reduces his efficiency as an employee is ostracized by his work associates or considered lacking in job proficiency by his foreman. In striking contrast is the plight of the white-collar problem drinker. While the cases available for study were too few to permit any firm generalizations, they are unequivocally pointed in the direction of social isolation from one's fellow workers and rejection by one's supervisors.

Since it is widely maintained that all three of the symptoms of employee mental illness here considered stem from multiple causes and probably reflect both predisposing and precipitating influences, none of the nine variables studied was expected to correlate very highly with any of the three. Even against such odds, however, the sociometric factors made an impressive showing in relation to absenteeism.

The significance of this study would appear to lie in its value for bringing to the attention of business and personnel managers the importance of building cohesive work groups, comprised of people who like and accept each other, as a potent prophylaxis against excessive absenteeism.

\* Speroff, Burt, and Kerr, William. "Steel Mill 'Hot Shop' Accidents and Interpretations." *Descriptive Studies in Social Psychology*, 1952, 1, 1-10.



## THE MANUSCRIPTS AND FRAGMENTS OF NOTKER'S PSALTER

by ALBERT LAWRENCE LLOYD, JR.\*

In contrast to Notker's other principal works, for which we possess relatively accurate, early manuscripts, the oldest complete copy of the Psalter which has been preserved is a 12th-century manuscript, R (St. Gall Codex 21), which shows striking deviations from the "normal" Notker forms, and a substantial number of errors, substitutions, and additions in the text. Fortunately, however, there are also extant a number of fragmentary manuscripts, some of which are much earlier and have preserved more completely the original language and text. It is only by a study of these fragments and a comparison of them with R and with each other, that a picture of the Psalter in its original form can be obtained. Although descriptions of some of the fragments have been undertaken in the past, the results have greatly varied in thoroughness and accuracy. The few previous attempts to compare manuscripts and determine the relationship between them have been even more incomplete and uniformly unsuccessful, in part because not all the fragments were available to the investigators, but also because an adequate descriptive study of them was lacking. Under these conditions, K. Zwierzina was forced to conclude in 1920 that no single stemma for all the manuscripts could be set up at that time.

Today, with the availability of photostatic copies of nearly all the manuscripts, and with the appearance of the new edition of the Psalter and the *Notker Hortschatz*, the time is ripe for a complete study of these important fragments, individually and collectively, and an attempt to determine once and for all whether Zwierzina's pessimistic conclusion must be accepted for our time also.

Thus, the task of this dissertation is a three-fold one: first, a thorough analysis and description of the individual fragments, making use of photographs wherever they are available; second, an effort to determine the original reading in cases where two or more manuscripts disagree; and third, an attempt to establish a stemma representing the relationship of the various manuscripts and fragments.

The oldest, and at the same time most accurate MSS which we possess are L and W<sup>1</sup>; these two fragments, together with V<sup>1</sup>, which must be considered in connection with L, present a good picture of the nature of the archetype.

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*MS L* (*Steyrer Bruchstück*, 11th century, containing Ps. 103:7-30) has preserved almost intact Notker's initial *v/f* alternation. The Law of Initial Stops is also regularly maintained within a sentence; initially in a sentence or phrase, however, they no longer receive special treatment, but are governed by the preceding sound, like those within a sentence. This well-written MS contains very few scribal errors, but the accentuation is extremely careless: many radical syllables and most final unstressed syllables appear without an accent, it is often misplaced on the word, and the acute and circumflex are frequently interchanged (the circumflex more often replacing the acute). One of the most striking characteristics of the fragment is its peculiar division of words within a line (e.g., *uerlōn genda, man nolih, and uuer ches*), perhaps indicating that these words were divided at the end of the line in the source.

In the cases where the readings in *L* differ from those in *R*, *L* can be shown to have retained the original version, while in every case it is *R* which has introduced innovations. The orthography in *L* also follows almost entirely Notker's normal usage; the few variations are minor, and in some cases may already have been present in the archetype.

*MS V1* (*Wallersteiner Blatt*, 11th century, containing Ps. 104:30-105:5), probably a somewhat later MS, is closely related to *L*. It is the only other MS in which the initial *v/f* alternation appears with almost complete regularity; its treatment of initial stops is also basically like that in *L*, but is more carelessly carried out. The accentuation also closely resembles that of *L*: like *L*, it has suffered a great loss of accents on radical syllables and an almost complete loss on unstressed final syllables, and has frequently misplaced them. *V1* and *L* also have the greatest number of erroneous accents for their length of any of the old Alemannic MSS, especially circumflex for acute; in two cases they both show errors in the same words: *oich* and *an*. Further, this fragment shows the same peculiar word division noted in *L* (e.g. *gezo gezu sprun gezinne*). According to Zwierzina (*PBB* 45, pp. 200-210), the script is also very similar. Nevertheless, they cannot very well be by the same scribe. Not only are there minor differences in the script, but the careful scribe of *L* could hardly have produced the rather inaccurate *MS V1*, which contains frequent scribal errors.

Because of their striking similarity and at the same time their differences, only two possibilities exist: either *V1* is copied from *L*, or both are copied from some lost MS from which they received their similar character. There is no way to establish with absolute certainty which of these alternatives is correct, since the two fragments do not cover the same area in the text; however, I am inclined to believe that *V1* came directly from *L*. It is probable that *L* was copied from the archetype itself, since the script indicates that it was probably written in St. Gall

very early in the 11th century, when the archetype was still there; in this case, V1 must then have been copied from L.

MS *H 1* (Basel, 11th century, containing Ps. 136:5-140:6) is also very close to the archetype, but it has lost some of the characteristics preserved by L and has preserved others which L has given up. It is the only MS of the Psalms to follow Notker's Law of Initial Stops in most cases at the beginning of a sentence as well as within a sentence, though it does show a tendency to change to the later rule (as found in L and V1). On the other hand, it has lost the original initial *v* *i* alternation entirely, in favor of *i* in all environments. It is the most accurate of all the fragments; even the accentuation is generally correct.

W1 and R show several significant differences in the text, especially in the Latin verses. In most cases R has changed the original reading, but once W1 has substituted the Vulgate form *magnificatus* for the original *mirificatus* in R.

Because W1 is such an early, accurate MS, there have been attempts to identify it with the archetype itself, or with the lost MS S (see below). The former is shown to be impossible by comparison with L and V1 which have preserved original features no longer found in W1. With the discovery of the new fragments of W1 in Basel in a codex which was already bound in the 15th century, it has become certain also that it cannot be part of MS S, which was still in the St. Gall library in the 16th century. However, W1, like L, must come (perhaps directly) from the archetype.

MSS U1 (*Seconer Blatt*, 11th century, containing Ps. 9 (Diapsalma): 4-18) and U2 (*Baumburger Blatt*, 11th century, containing Ps. 21:19-22:3) have several features in common: e.g. final *he* for *h* once in U1 (*starhe*) and twice in U2 (*männliche, dake*), and the same error *dinen* (*tinne*) for *dien* (*tiin*) once in each MS. In addition, the MSS were found in Secon and Baumburg, respectively, which are not far apart, and the script is approximately contemporaneous. They cannot be by the same hand, however. The script shows significant differences; also U2 has *ld* in *unaldet, gemalde*, where U1 regularly shows *lt*.

There is not enough evidence to establish definitely what relationship, if any, exists between these MSS. They may come from a common source; they may even, as Golther suggests (*ZfdA* 37, p. 277), be from the same codex, but this cannot be proved. Their place in the stemma is another matter, however. Here the treatment of initial *v* *i* is the decisive clue. Although the original distribution has been nearly abandoned in favor of *i* in all environments, U1 still shows *v* (written as *u*) three times after sonants, U2 once. Comparing this with the same area in R, we find an almost exact parallel. In the portion covered by U1, R has retained *v* only four times, of which three are the examples which also



had *v* in U1; in the area covered by U2, R shows *v* only in the one example where it occurs also in U2. Such close agreement, out of the many possible occurrences, cannot be explained by coincidence. It is also not a question of certain words being more prone to retain *v* than others. The one example of *v* in U2 and R, for example, is in *uallent*: in the preceding sentence, also after a sonant, the same word appears with an *t* in both MSS. Similar examples can be found in U1.

Thus, U1, U2, and R come (directly or indirectly) from a common source, which will be designated as MS *a*, a MS which normally uses initial *t*, but has retained some examples of *v* from the archetype.

The Bavarian MS Y (Vienna, 11th century, containing the entire Psalter except for Ps. 51-100) has undergone so many changes that it offers little evidence as to the identity of its source. Nevertheless, one small but significant feature gives at least an indication of its place in the stemma. Again it is the *v/t* distribution which is of great assistance. Of course Y has obscured the original distribution, but one clue can be found. Y does not use the word *ficht*, which is found frequently in R. Except for two cases which are lacking or replaced by other constructions in Y, all the examples in which *ficht* begins with *t* in R are replaced in Y by *geunucht* (once *unucht*). In the one case, however, where R has *urichte*, Y writes the senseless *urichte*, obviously showing a misunderstanding of an *urichte* in the source. Thus Y must come, at least indirectly, from a MS which has the same distribution of *v* and *t* as R does, that is, MS *a*. Verification of this can also be found in the next MS, X.

MS X (St. Pauler Benediktine, 12th century, containing Ps. 17-17:51, Ps. 118:170-120:1) shows much younger forms than R, in respect to phonology (especially the vocalism, which approaches that of MHG), vocabulary, and syntax. The text has also been changed to some extent, both by omissions and later additions. It is the only extant MS besides R (and the late Loubère MS) which has OHG glosses, however the glosses in X have no connection with those in R. In addition, nearly all Latin words in Nöcker's commentary which are not glossed are translated. Neither the glosses nor the translations agree with the translations in Y.

In spite of the many alterations which MS X has undergone, it is nevertheless possible to determine its relationship to the other MSS of the Psalter. Several significant features indicate a close connection between X and Y. The most important are: the error *et* in X and Y for *ita* in R (Piper 443:18, Schrift 947:17); *weert* in X and Y for the more usual *glanze* in R translating *atris* (Ps. 111, 88:21); indicative *ant* in X, *unite* in Y, for the better subjunctive *antle* in R (Ps. 145:22, 59:19-21); the omission in X and Y of *füllen* (Ps. 102, 50:15) and



*fruchtlich* *sinn* (P546:28, S951:3), which are present in R and must have been original. X cannot be copied from Y, since it frequently shows a more complete or original text than Y. Therefore they must come from a common source, which will be called MS b. Since MS X shows one of the Latin glosses found in R (P546:26-27, S951:1-2; in X the gloss has been inserted in the text in place of the original reading), R and MS b must come from a common source which already contained the Latin glosses. This must have been MS a, to which the glosses were added at some time after its completion (W1, which comes from the archetype, and W2, which, it will be shown, was copied from MS a, apparently at an earlier date, both fail to show Latin glosses found in R).

MS F2 (Wallerstein, 14th century, containing the Canticum Sanctae Mariae: 50-55 and the Fides Sancti Athanasii Episcopi: 1-2, 11-20). Alone of all the 11th-century Alemannic MSS. has only 25 lines to the left instead of the usual 32. It is also characterized by the most complete accentuation of any of the MSS: it has accents on articles even where Notker's rules do not call for them; obviously indicating additions by the scribe. On the other hand, final unstressed syllables are never accented.

The text generally does not differ significantly from that in R, however, three cases may indicate a connection between V2 and Y: the omission of *et* (P642:26, S1113:10) in V2 and Y (then added above the line in Y), *genemmeda* in V2 and Y twice for *genemmeda* (P639:4, S1107:16/17), and *reda* *oeben* in both MSS for *reda* *irgeben* in R (P644:10, S1116:14). The evidence is extremely weak, especially the last two cases, it can only be said that there is a good possibility that V2 was copied from the same source as Y, i.e., MS b. It can be established, however, that V2 and the text MS to be discussed, W2, came, at least indirectly, from a common source.

MS H2 (Basel, 11th century, containing the Cantica Zachariae Regis: 17-20, Annae, Moysi, Abime, and Deuteronomii: 1-31) and V2 have both abandoned the original construction of initial *v* 1, and show a preference for *i* in all environments. They have, however, retained a certain number of examples of *v* after sonants. Further, the ratio of the occurrences of *v* to the total number of examples of *v* 1 after sonants is almost identical in both (W2: 31 to 59, or 22.0 per cent; V2: 4 to 18, or 22.2 per cent), surely indicating a common source for these two MSS. This could not be the archetype, in which *v* was still the predominant form. It has been shown by a comparison of U1, U2, and R that MS a, though using *i* in most cases, retained occasional examples of

v; therefore it (or MS b, which was copied from it) could be the source of V2 and W2.

Attempts have been made to establish a relationship between W2 and Y; however, most of the apparent similarities are only illusory. Moreover, any relationship seems to be ruled out by the presence of a Latin gloss in R which does not appear in W2. Since it has been shown that the Latin glosses must already have been present in MS b, it is impossible to derive W2 from b, unless we assume that these glosses were added at different times to different MSS, which seems highly improbable. Since W2, R, and Y all show common features which must come from their source and were surely not in the archetype (especially the omission of a Latin verse for which the German translation is present), W2 can only come from MS a.

Three minor 11th and 12th century MSS remain to be discussed, none of which contribute significantly to our knowledge of the Psalter and its copies.

MS A (Aschaffenburg, 12th century, containing Ps. 28:1-8) shows some indications of a relationship with Y. The most important similarity is the error *intercedentis* for *intercedentis* in R (Pg 20, S147:1); a few other cases may also be significant, but are less certain. In translating original Latin words, A and Y also agree frequently (e.g. *opfer* for *actima*, where Notker would use *trisking*; singular *scrip* for plural *scripturas*; *lectare dis cortis* in A, *lectari des quartires* in Y to translate *Duces greco*), but they disagree three times, and Y translates in three cases where A keeps the Latin. These could of course be later changes in Y, and do not necessarily militate against a common source for the two MSS, i.e., MS b. There is not enough evidence, however, to establish this definitely.

MS E (Two small parchment strips, 11th century, containing a few words from Ps. 88 S 10, 16) is too short to enable any conclusions to be drawn concerning its relationship to the other MSS.

MS T (Munich, 12th century, containing Notker's Paternoster) also shows little of importance, beyond the substitution of younger forms and a few minor textual changes. Its location in the stemma cannot be determined.

The last MS S (the so-called Codex Vadianus, in the St. Gall library as late as the 16th century, then in the possession of Marquard Freher, Barth. Schobinger, and Melchior Goldast, and finally lost) is preserved only in a copy of the Paternoster and Symbolum Apostolorum (without the Latin verses or German commentary) made in the 16th century by Vadian, the *Bürgermeister* of St. Gall (then copied and compared with the MS again by Schobinger), and a few brief quotations from the MS by Freher and Goldast. Although these late copies have

undergone great alterations and show a large number of errors, a comparison of the various versions reveals that the MS itself was rather accurate and conservative, occasionally showing more original forms than R. The Law of Initial Stops must have been carried out, at least to some extent, but the initial *v* *i* alternation had been nearly or entirely abandoned. Most important of all, MS S contained the same OHG glosses found in R (Freher quotes two which agree word for word in S and R), but lacked the Latin title and concluding couplet which appear in R.

Thus it is certain that MS S cannot be identical with R. This is further borne out by the fact that R is known to have been in Einsiedeln as late as the 17th century. Because of the prevailing use of initial *f* and the presence of the glosses, S also cannot be the archetype. Since the glosses are also found in R, but in no other MS, only two possibilities remain: either S is the source from which R was copied, or it is a copy of that source, which must also have contained the glosses.

The few known facts about the history of the MSS of the Psalter may be of help in identifying MS S more accurately. In the year 1027, when the Empress Gisela visited the Monastery of St. Gall, only one copy of Notker's Psalter was present; it was reported that a copy was made at that time, and the Empress took the original with her. It can be seen from the stemma, below, that only MSS L and W1 were copied, from the archetype; all the others apparently came, directly or indirectly from a second source, MS a. The most obvious reason for this would be that the archetype had been taken from St. Gall, leaving MS a, the 1027 MS, as the only remaining source for future copies.

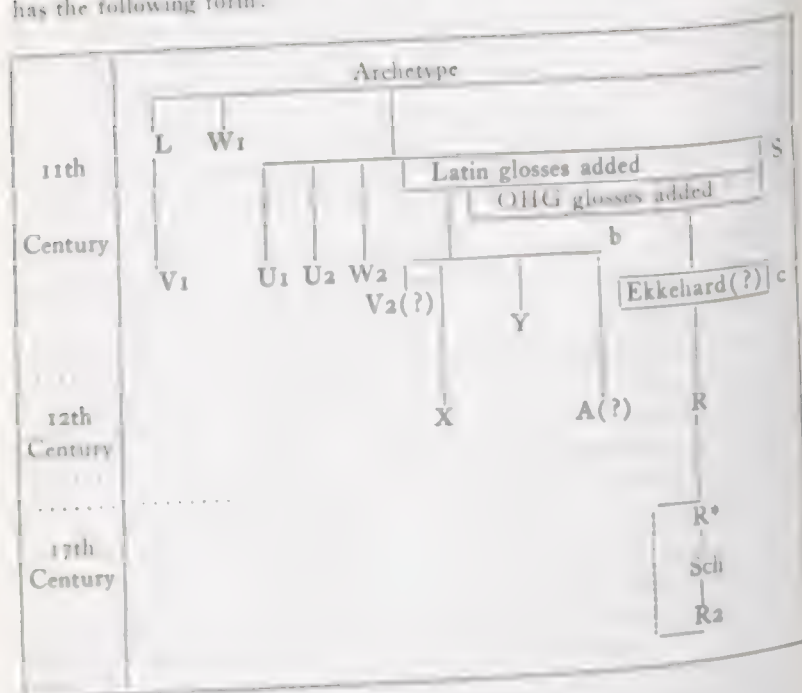
In 1461, a catalogue of the library lists only one copy of the Psalter; again in 1529-30, when Vadian made the acquaintance of MS S, it was the only copy in the library. There is little doubt that the MS in the 1461 catalogue and MS S are identical. It is also probable that this was still the 1027 copy (our MS a); having once lost the original, the monastery would certainly take great care to keep the first copy. This is supported by Metzler and Goldast, both of whom identify S as the MS made in 1027. Thus, both internal and external evidence indicate that MS S is the 1027 copy and the source for R and most of the fragments.

Since the Latin couplet at the end of the Psalter is probably by Ekkehard IV (who died in 1060), there must have been an intermediate 11th century MS between S and R, to which it, and probably other Latin insertions in the text, was added (MS c).

*The Loubère MS, R\** (a copy of the Psalter made in 1675 for Simon de la Loubère) and the copies made from it (Sch: a copy made in 1697 for Johann Schilter, and R2: a copy made in the same year for Friedrich Rostgaard and then corrected by comparison with R\*) have been proved



The complete stemma of the MSS and fragments of the Psalter thus has the following form:





## GLYCOGENESIS IN THE LIVER OF NORMAL AND DEPANCREATIZED RATS

by ROBERT WILLIAM LONGLEY\*

The problem of glycogenesis in the liver has been investigated with a direct approach, making use of an essentially new method of extracting and measuring liver glycogen. The method consists of extraction of glycogen by homogenizing the whole liver in 5 per cent trichloroacetic acid, precipitating the glycogen from an aliquot of the extract, and measuring the glycogen with an anthrone reagent.

After exactly 24 hours of fasting, animals received an intraperitoneal injection of a 10 per cent sugar solution at the dosage of 2 gm per kg of body weight. This mode of administration was chosen to simulate the clinical practice of intravenous infusion and thus to give a better idea of the glycogenic utilization of the sugar under such conditions. At varying intervals after the injection of the sugar, the animals were anesthetized; the whole liver was removed, homogenized, and the glycogen content was determined. This procedure was followed in ascertaining the response to glucose, fructose, and invert sugar in normal rats and with glucose and fructose in totally depancreatized rats. The values at intervals were plotted against time, and curves describing the rate of glycogenesis were constructed.

In the normal animals it was found that fructose caused a faster initial deposition and a greater per cent utilization of the sugar for glycogen formation in the liver over the first 6 hours than did glucose. Invert sugar caused a response intermediate between its two component sugars. The curve for fructose administration exhibited a rise to a peak at 3 hours, a drop at 4 hours, and a second rise at 5 and 6 hours after administration. Since the blood glucose pattern showed a rise between 4 and 5 hours, and since the 4 hour drop in liver glycogen did not appear when glucose and fructose were given together, as in invert sugar, this phenomenon has been attributed to a glucose stimulation.

In the depancreatized animals, the response to both glucose and fructose was similar to that of the normal animals. The comparison of the normal and depancreatized rats given fructose showed that the response was remarkably similar over the first 5 hours, even to the drop at 4 hours, and fairly similar over the latter part of the experimental time period. This is interpreted as supporting the current views that the metabolism of fructose is essentially unaffected by the presence or absence of endogenous insulin.

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The comparison of the normal and depancreatized rats given glucose shows that the totally depancreatized rat actually deposits more glycogen from the same dose of glucose than does the normal under the same conditions. The average percentage of the injected sugar recovered as glycogen during the first three hours for the normal was 16.9 and for the depancreatized rat, 28.1. Though this is contrary to the existing concepts, the inference has been drawn that the absence of the pancreas and its hormones does not affect the normal metabolic pathway of glucose to glycogen in the liver.

The effect of glucagon on glycogenesis was investigated with the same procedure, but with the administration of glucagon simultaneously with glucose. Glucagon caused a definite depletion of liver glycogen even in the presence of a substrate already shown to enhance markedly the process of glycogenesis. In normal animals receiving glucagon, despite the fact that glucose was given and no glycogen was deposited, the blood sugar level was in the normal range. In the depancreatized animals, under the same conditions, there was again no glycogen stored in the liver, but there was an increase in the blood sugar level.

# THE LINEAR HYPOTHESIS, INFORMATION, AND THE ANALYSIS OF VARIANCE

by CHESTER HAYDEN MCALL, JR.\*

In an attempt to unify the analysis of variance for both orthogonal and nonorthogonal designs, the method of Information Theory is introduced. Given two multivariate normal populations, say  $P_1$  and  $P_2$ , whose densities are respectively  $f_1(X')$  and  $f_2(X')$ , the mean information per observation from  $P_1$  for discrimination between  $P_1$  and  $P_2$  is defined by Kullback and Leibler as

$$I(1:2) = \int \int \log[f_1(X')/f_2(X')] f_1(X') \frac{1}{n} dX,$$

Because of symmetry, the mean information per observation from  $P_2$  for discrimination between  $P_1$  and  $P_2$  is defined in a similar manner. Next, the divergence between  $P_1$  and  $P_2$  is defined by Kullback and Leibler as

$$J(1:2) = \int \int [f_1(X') - f_2(X')] \log[f_1(X')/f_2(X')] \frac{1}{n} dX, \\ = I(1:2) + I(2:1)$$

Utilizing the linear hypothesis as a basis for the analysis of variance, observations in an experiment are defined in terms of the matrix equation

$$Y = XB + e$$

where  $B$  is a matrix of parameters,  $X$  is a matrix of appropriately located 0's and 1's, and  $e$  is a matrix of errors which are normally distributed with mean 0 and variance  $\sigma^2$ . The parameter matrix  $B$  is dependent upon  $P_1$  and  $P_2$ . From the above equation, the divergence parameter  $J(1:2)$  is shown to be

$$J(1:2) = [B_{10} - B_{20}]' \frac{X'X}{\sigma^2} [B_{10} - B_{20}]$$

Under the assumption that  $H_1$  (an hypothesis about  $P_1$ ) imposes no restrictions on  $B_{20}$  and that  $H_2$  (an hypothesis about  $P_2$ ) imposes the restriction that  $B_{10} = 0$ , the previous divergence equation reduces to:

$$J(1:2) = B_{20}' \frac{X'X}{\sigma^2} B_{20}$$

\* A.B. 1931, A.M. 1933, The University of Wisconsin, University of Ph.D. received February 12, 1957. Professor in Charge of Statistics, Frank Mark Wertz, Professor of Statistics.



which is equivalent to the common null hypothesis from which  $J(1:2)$  now measures the degree of departure.

Since it is quite unlikely that either the parameter matrix or  $\sigma^2$  will be known, it is necessary to estimate these terms. The least squares technique is employed to obtain best unbiased estimates for the parameters. The expression above then reduces to:

$$\hat{J}(1:2) = \frac{\bar{B}'X'XB}{\hat{\sigma}^2}$$

where the caret (^) indicates best unbiased estimate.

It is then shown that the estimate of the Kullback-Leibler divergency is equivalent to

$$\hat{J}(1:2) = n_1 F$$

where  $F$  has  $n_1$  and  $n$  degrees of freedom. This, of course, is valid under the null hypothesis.

Since, quite often, it is desirable to test various parameters independent of the other parameters, a set of sub-hypotheses may be tested. By this process,  $\hat{J}(1:2)$  is broken apart into desirable independent sums, say,

$$\hat{J}(1:2) = \hat{J}_1(1:2) + \hat{J}_2(1:2) + \hat{J}_3(1:2)$$

which are distributed like  $n_1 F$ ,  $n_2 F$ , and  $n_3 F$ , where  $F$  has  $n_1$  and  $n$  degrees of freedom,  $n_2$  and  $n$  degrees of freedom, and  $n_3$  and  $n$  degrees of freedom respectively.

The technique is now applied to four classical experimental designs in the analysis of variance: one-way classification, two-way classification, two-way classification with replication, and Latin Square. Furthermore, the "analysis of variance" or fixed model is assumed throughout the paper.

For the orthogonal designs, it is shown that  $\hat{J}(1:2)$  can be broken down into a sum of independent sums by means of which it is possible to test the significance of all desirable effects. In each case, the parameters are estimated, the variance-covariance matrix for these estimates is available, and the necessary sums of squares are computed. Tests of significance are run and the expected results obtained.

For the nonorthogonal designs (two-way classification and higher) it is shown that the estimates of the different main parameters are not independent as in the orthogonal case (i.e., row estimates are not independent of column estimates). To meet this situation, the concept of "conditional hypotheses" is introduced. For the two-way classification and the Latin Square, results consistent with the orthogonal tests are obtained. For the two-way with replication design, somewhat different conclusions are drawn. These differences are apparently accounted for by the degree of correlation existing among the parameter estimates.



Suggestions are made for possible techniques to analyze these apparent discrepancies.

Recommendations are presented for future research problems which have emanated from this paper. Such items are discussed as programming for electronic computers, development of  $J(1:2)$  tables, studies of the variance-covariance matrices in the nonorthogonal cases, establishment of upper limits for allowable numbers of missing observations in the various designs, and the application of this technique to the "components of variance" model.

## CONTRIBUTIONS TO FLUORINE CHEMISTRY

### I THE HYDROLYSIS OF NEODYMIUM FLUORIDE II THE FLUOROPLATINATES OF MAGNESIUM, THE ALKALINE EARTHS, AND CERIUM (III)

by MARRINER KRUMM NORR\*

Previous work in this laboratory showed that when neodymium fluoride was heated in air at  $900^{\circ}\text{C}$ , it lost more than 10 per cent of its weight and formed a brown product. Several earlier investigators had observed that the heating of the fluorides of yttrium and lanthanum in air converted them first to the corresponding oxyfluorides and finally to the oxides, but were not agreed on the mechanism of the reactions—whether it was hydrolysis or oxidation. The present study was undertaken to determine the compound or compounds formed when neodymium fluoride is heated in air and to find the agent (water vapor or oxygen) causing the change.

Three 2 gram samples of neodymium fluoride ( $> 99.9$  per cent pure) were dried to constant weight at  $400^{\circ}$ , forming I. I was heated to constant weight in air at  $750^{\circ}$  (requiring 48 hours) forming a lavender product, II. (The brown color of the product mentioned in the last paragraph was probably due to contamination by praseodymium, which was known to be present.) One sample of II was reserved for further tests. The other two were heated in air to constant weight, first at  $950^{\circ}$  (requiring 148 hours) and then at  $1000-1050^{\circ}$  (requiring 22 hours), forming III.

III was assumed to be neodymium oxide. This was confirmed by the fact that it was easily soluble in dilute hydrochloric acid, giving a lavender solution.

Taking III as neodymium oxide (with a weight equivalent per neodymium atom of 168.27, i.e.,  $\frac{\text{M. W. of Nd}_2\text{O}_3}{2}$ ), the weight equivalent of

II was calculated from the weight lost when it was converted to the oxide. This was found to be 179.31, which is very close to the theoretical weight equivalent of the oxyfluoride (i.e., 179.27).

The X-ray diffraction pattern of II was taken, and it was found to be different from those of neodymium fluoride and oxide. It showed no evidence for contamination by either the fluoride or oxide.

On the basis of its X-ray diffraction pattern and its weight loss upon conversion to the oxide, II was concluded to be neodymium oxyfluoride containing no appreciable amounts of the fluoride or oxide.

U.S. 1947 M.S. 1952, The George Washington University; Ph.D. conferred February 1955. Professor in charge of research: Charles Rudolph Naezer, Professor of Chemistry.

The oxyfluoride was found to be insoluble in both hot and cold water. It was decomposed to a soluble compound by 1:1 hydrochloric acid, slowly at room temperature, but much more rapidly at the boiling point.

The density was determined at  $25.0 \pm 0.5^\circ$ , using a 1-ml. pycnometer with toluene as the displacement liquid. A value of 0.51 was obtained.

To determine which agent (water vapor or oxygen) was responsible for the conversion of neodymium fluoride to the oxyfluoride and the oxide, dry nitrogen, dry oxygen, undried air, an air steam mixture, and a strong current of steam were successively passed over a 1 gram sample of neodymium fluoride at  $750^\circ$ . In the current of dry nitrogen the salt lost 10.8 mg before reaching constant weight. This loss was believed to be due to the presence in the fluoride of a small amount of tightly held water which at  $750^\circ$  caused some of the salt to hydrolyze. When the sample was heated for half an hour at  $750^\circ$  in dry oxygen, no weight was lost. Similar heating in undried air caused a loss of 1.5 mg; in an air steam mixture, 14.5 mg; and in a strong current of steam, 91.4 mg. It was concluded that water vapor was the agent that had caused the conversion of neodymium fluoride to the oxyfluoride, and there seems to be no doubt that it was also responsible for the conversion of the latter to the oxide.

To determine if neodymium fluoride showed any tendency to hydrolyze at  $400^\circ$ , a weighed sample (dried to constant weight at the same moistened with water and again dried to constant weight at the same temperature. The treatment was repeated. The initial and final weights were the same, indicating that the salt showed no tendency to hydrolyze at temperatures up to  $400^\circ$ .

After the completion of this work, the preparation and study of some of the properties of the fluorates of neodymium, the alkaline earths, and cerium (III) were undertaken. Of these, only the barium compound had been reported previously, and nothing had been published regarding its solubility and density. During the course of our work, the crystal structure of strontium fluorate was reported, but neither the method of preparation nor any physical properties other than structure were described.

Lanthanum fluoroplatinate was prepared by passing a stream of fluorine over a 1:1 mixture of platinum powder and lanthanum fluoride for half an hour at a temperature of  $525-550^\circ$ . The product was freed from to cool to room temperature in a current of fluorine and was freed from its contaminants by dissolving it in water and filtering off the impurities (which were insoluble).

The solution was added to a beaker containing an excess of hydrogen-charged Amberlite IR 120 cation exchange resin and stirred magnetically for fifteen minutes. The removal of lanthanum by the resin was shown by the absence of a precipitate when a few drops of 48 per cent hydro-



fluoric acid were added to several milliliters of the supernatant liquid. The solution—fluoroplatinic acid—was filtered and then evaporated to a small volume in a vacuum desiccator. Unlike solutions of lanthanum fluoroplatinate, those of the acid can be stored indefinitely.

Magnesium oxide was added to a portion of the acid until the pH of the solution rose to 7.0 (as measured by a Beckman pH Meter, Model G). The solution was filtered and evaporated to a small volume in a vacuum desiccator. At this point a small amount of black impurity, indicating a slight decomposition, was present. This was filtered off, and when the filtrate was poured into about five times its volume of acetone, tiny yellow crystals of magnesium fluoroplatinate formed. These were dissolved in a minimum volume of distilled water and precipitated as before. The salt was filtered off, washed with acetone, and dried in air.

Solid calcium hydroxide was added to a solution of fluoroplatinic acid until the pH of the latter rose to 7.0. The solution was filtered, evaporated to a small volume in a desiccator, and then filtered again to remove some black decomposition products that had formed during the evaporation. When the solution was added to five times its volume of acetone, a yellow "oil" sank to the bottom. The upper phase was decanted and replaced with an equal volume of fresh acetone. The resulting calcium fluoroplatinate precipitate was dissolved in a small volume of water and precipitated as before. The salt was then filtered off, washed with acetone, and dried in air.

To a solution of fluoroplatinic acid was added just enough strontium carbonate to bring the pH of the former to 4.0. From this point on, the preparation of strontium fluoroplatinate was identical with that of the lanthanum compound.

Barium fluoroplatinate was obtained by adding a concentrated solution of barium chloride to a solution of lanthanum fluoroplatinate. The barium fluoroplatinate precipitate was filtered off, washed with water and acetone, and dried in air.

An excess of cerium (III) carbonate was added to a concentrated solution of fluoroplatinic acid, stirred for a few minutes, and the excess carbonate filtered off, leaving a clear solution of cerium (III) fluoroplatinate. When the latter was poured into about five times its volume of acetone, a dark yellow "oil" sank to the bottom. Continued washing of the "oil" with fresh acetone failed to precipitate the salt. The "oil" was thoroughly mixed with an equal volume of absolute ethanol and then with about five times as much acetone. The upper layer was decanted and the treatment repeated. The resulting cerium (III) fluoroplatinate precipitate was filtered off and washed, first with acetone and then with ether. The salt was dried in a current of dry nitrogen. When a small amount was dissolved in water, the solution showed a very slight tur-



bidity, indicating decomposition. After standing several days, samples of the solid salt were badly decomposed. Of the five fluoroplatinates prepared, this was, by far, the least stable. Of these, only the cerium salt was hygroscopic, and then only on humid days.

The cation content of each compound was determined by a standard procedure: magnesium as the pyrophosphate, sodium as the carbonate, strontium and barium as the sulfates, and cerium as the dioxide. The values obtained were consistent with the formulas given in Table 1.

The presence of the fluoroplatinate ion in each salt was confirmed by its absorption spectrum (measured with a Model DU Beckman Spectrophotometer). In the case of the cerium compound, the spectrum of the cerium (III) ion interfered with that of the fluoroplatinate. It was removed by adding a slight excess of oxalic acid, and the latter (the spectrum of which also interfered to some extent) was removed by adding a slight excess of calcium hydroxide. The final solution showed the characteristic fluoroplatinate spectrum.

All five of the salts were insoluble in acetone, ethyl ether, benzene, and acetic acid. The magnesium compound was somewhat soluble in absolute ethanol, but the other four were insoluble.

Saturated aqueous solutions of the five fluoroplatinates (each in contact with the corresponding solid salt) were ignited in a  $25.0 \pm 0.2^\circ$  water bath. One-milliliter portions (ten milliliters in the case of barium, because of its low solubility) were pipetted into weighed, covered, platinum crucibles, evaporated to dryness, and ignited to constant weight. The weight of salt represented by one gram of its ignited residue was determined by igniting a known weight of the salt and measuring the weight of the residue thus formed. From these data the solubilities were determined. They are listed in Table 1.

The densities were measured at  $25.0 \pm 0.2^\circ$ , using a 5-ml. pycnometer with toluene as the displacement liquid. The results are shown in Table 1.

TABLE 1  
PROPERTIES OF THE FLUOROPLATINATES

Compound	Color	Density ( $25^\circ\text{C}$ )	Solubility in Water (Gms Salt per 100 ml Soln. at $25^\circ\text{C}$ )
$\text{MgPtF}_6 \cdot 6\text{H}_2\text{O}$	Yellow	2.05	67.9
$\text{CaPtF}_6 \cdot 2\text{H}_2\text{O}$	Yellow	4.13	104.9
$\text{SrPtF}_6 \cdot 2\text{H}_2\text{O}$	Yellow	4.42	98.6
$\text{BaPtF}_6$	Yellow	6.04	0.171
$\text{Ce}_2(\text{PtF}_6)_3 \cdot 10\frac{1}{2}\text{H}_2\text{O}$	Yellow	4.03	170.4

## THE ANTIGENIC STRUCTURE OF PSITTACOSIS AND FELINE PNEUMONITIS VIRUSES

by MARTIN RUSSELL ROSS\*

The antigenic nature of members of the psittacosis-lymphogranuloma group of viruses has been investigated by Bedson (1936), Hilleman and Nigg (1948), Barwell (1952a,b), and Polikoff and Sigel (1953). Group and specific complement fixing antigens have been demonstrated in elementary body preparations obtained from a number of infected tissues. Differences in resistance to heat and chemical agents have also been observed which differentiate the stable group and unstable specific antigens. With the exception of the work of Hilleman and Nigg (1948) dealing with the isolation of an ether soluble lymphogranuloma venereum antigen from infected yolk sacs, no studies have been reported on the isolation and characterization of these complement fixing antigens. Most of the serological work has been done on the intact virus partially purified by differential centrifugation. Also, only indirect methods have been utilized to investigate the chemical nature of these complex group and specific complement fixing antigens.

The isolation of group and specific complement fixing antigens from this group of agents would be of value in studying their relationship more closely and might also be useful for diagnostic purposes. A further study could also be made of the serological properties, biological effects, and chemical nature of these complex virus antigens.

This investigation is concerned with the serological and chemical characterization of group and specific psittacosis and feline pneumonitis complement-fixing antigens isolated from purified virus suspensions. Studies were initiated (1) to develop a fractionation procedure for the isolation and purification of these antigens, (2) to investigate their serological properties by means of conventional serological techniques and by treatment with chemical and physical agents and (3) to determine their chemical nature by the use of spectrophotometric, enzymatic, and paper chromatographic techniques.

Prior to chemical fractionation two procedures for the disruption of psittacosis virus purified by differential centrifugation were attempted. The first, alternate freezing and thawing, failed to disrupt the virus. Sonic vibration, the second method attempted, effectively disrupted the virus particle. Electron micrographs taken after three hours of sonic treatment showed the presence of amorphous fragments much smaller in

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size than the elementary body. Only an occasional intact virus particle was found. Identical results were obtained with the feline pneumonitis virus treated with sonic vibration in the same manner.

Nitrogen determinations performed on the disrupted psittacosis elementary body suspensions showed that a large percentage of the total nitrogen present could be sedimented at 5000 X *g* in 30 minutes. Flocculation tests on both the sediment and supernatant fluid indicated that the serological activity was contained in the sediment only. The absence of soluble nitrogen containing antigens in the distilled water preparations of soluble nitrogen prompted the investigation of a procedure used by Smadel *et al.* (1940) for the extraction of a nucleoprotein antigen from vaccinia virus. A modification of this procedure was applied to both psittacosis and feline pneumonitis viruses. Disrupted, lyophilized virus was initially separated into ether insoluble and ether soluble fractions. The ether insoluble fraction was further separated into alkali-soluble and alkali insoluble fractions. The ether soluble fraction was subfractionated with acetone and methanol by a method based on that of Hillebrand and Nigg (1948). The virus fractions were then tested by complement fixation with homologous and heterologous antisera prepared against sonically disrupted elementary body preparations. The alkali-soluble, ether-soluble, acetone-insoluble, and methanol-insoluble fractions of both viruses were positive in the complement fixation test with both homologous and heterologous antisera. The alkali-insoluble, acetone-soluble, and methanol-soluble fractions were negative. A further study of the serological and chemical properties of the serologically-active fractions was undertaken.

The percentage yields and serological potency of the virus fractions obtained from the psittacosis and feline pneumonitis viruses were calculated from dry weight determinations and complement fixation titers. The yield of alkali-soluble material derived from the psittacosis virus was considerably greater than that obtained from feline pneumonitis. Conversely, the amount of ether-soluble, acetone-insoluble, and methanol-insoluble material extracted from feline pneumonitis virus was greater than that obtained from the psittacosis virus. The methanol-insoluble fractions comprise only a very small percentage of the total dry weight of the original virus suspension. The serological potency of the psittacosis and feline pneumonitis fractions was obtained by determining the highest dilution of each fraction positive in the complement fixation test. The ether-soluble fractions of both psittacosis and feline pneumonitis viruses were more active in the complement fixation test than the alkali-soluble fractions. An increase in the serological activity of the ether-soluble fractions was obtained by fractionation with acetone and methanol. Although a higher degree of purification was obtained by methanol extraction, this procedure partially destroyed the total serological activity



present in the acetone-insoluble fractions. For this reason, further serological work was confined to the ether-soluble, acetone-insoluble fractions. The term "ether soluble" will be used to describe the ether-soluble, acetone insoluble fractions throughout the remainder of this summary.

The specificity of the psittacosis and feline pneumonitis alkali-soluble and ether-soluble antigens was investigated by means of cross complement fixation tests. Antipsittacosis and antifeline pneumonitis guinea pig sera (six of each), prepared against sonically-disrupted elementary body preparations, were titrated against two units of the alkali-soluble and ether soluble antigen preparations. Identical antibody titers were obtained in the tests with the psittacosis and feline pneumonitis alkali-soluble antigens except for an insignificant one-tube difference in three of the sera. The same situation was found to exist with the psittacosis and feline pneumonitis ether-soluble antigens—almost a perfect cross reaction was noted when these antigens were tested against homologous and heterologous antisera. All four antigens tested exhibited group serological activity.

The above results showed that the psittacosis and feline pneumonitis alkali-soluble and ether-soluble fractions all reacted in a group specific manner. However, if a specific antigen were present, it probably could not be detected in the presence of the group antigens. Therefore, attempts were made to demonstrate a specific antigen in the virus fractions by the following methods:

(1) *Cross absorption*.—Aliquots of an antipsittacosis guinea pig serum were absorbed with psittacosis and feline pneumonitis alkali soluble and ether-soluble antigens and then tested in cross complement fixation tests against the four antigens used for absorption. Control guinea pig antisera, receiving no antigen but otherwise treated in the same manner as the absorbed sera, showed cross reactions to the same degree with all four of the antigenic fractions. It was found that only absorption of the psittacosis antiserum with the psittacosis alkali soluble fraction removed all of the serological activity. Absorption of the antiserum with the other three fractions left significant remaining activity against the psittacosis alkali-soluble antigen which represents the specific activity of the antiserum. Essentially the same serological pattern was obtained with a feline pneumonitis antiserum absorbed in the same manner. A specific reaction was obtained with only the feline pneumonitis alkali-soluble fraction. It became obvious from the above cross absorption experiments that the psittacosis and feline pneumonitis alkali soluble fractions contained specific serological activity as well as group activity. No specific activity could be detected in the ether-soluble fractions. These observations were confirmed in the following experiments with potassium periodate and lecithinase.



(2) *The effect of potassium periodate on serological activity.*—The action of potassium periodate on the psittacosis and feline pneumonitis alkali-soluble and ether-soluble fractions was investigated. The antigenic fractions were treated with 0.005 *M* potassium periodate for 30 minutes at 37°C and then tested in the complement fixation test against serial dilutions of homologous and heterologous guinea pig antisera. Potassium periodate effectively destroyed the group serological activity of the psittacosis and feline pneumonitis alkali-soluble fractions. Also, of greater significance, the specific activity present in these fractions was not destroyed by periodate treatment. The complete destruction of serological activity in the psittacosis and feline pneumonitis ether-soluble fractions confirms the results obtained in the cross absorption experiments. No specific activity could be demonstrated in these fractions either by cross absorption or destruction of group activity with periodate. Treatment of the alkali soluble fractions with potassium periodate by the above method produced specific psittacosis and feline pneumonitis complement-fixing antigens.

(3) *The effect of enzymes on serological activity.*—Enzymatic destruction of the serological activity of the alkali-soluble and ether-soluble fractions was attempted in these experiments. The antigens were incubated at 37°C for one hour in the presence of trypsin, papain, desoxyribonuclease, ribonuclease, and lecithinase A (*Naja Naja* cobra venom) and then tested in the complement fixation test against serial dilutions of homologous and heterologous guinea pig antisera. Appropriate control antigen preparations were included in the tests. No destruction of serological activity of the psittacosis and feline pneumonitis alkali-soluble and ether-soluble fractions was noted after treatment with trypsin, papain, desoxyribonuclease, or ribonuclease. Both homologous and heterologous antiserum titers were identical with those obtained with control antigen preparations. In contrast with the negative results obtained with the proteinases and the nucleases, complete destruction of group serological activity of the alkali-soluble and ether-soluble fractions was obtained with lecithinase A. After lecithinase treatment, the psittacosis and feline pneumonitis alkali-soluble fractions gave positive reactions with only their homologous antisera—the specific activity of these fractions was not destroyed by lecithinase. The psittacosis and feline pneumonitis ether-soluble fractions were negative with both homologous and heterologous antisera. No specific activity could be detected. Control alkali soluble and ether-soluble fractions incubated with buffer in place of the enzyme were serologically active with both homologous and heterologous antisera. The end results are essentially the same as those obtained with periodate. Subsequent experiments showed that the specific activity remaining in the alkali-soluble fractions after periodate or lecithinase treatment could be sedimented in 30 minutes at 26,000 X  $g$ .

in the Spinco ultracentrifuge. It was found that this specific activity could be destroyed with papain. A similar destruction of the specific serological activity was not obtained with trypsin. Destruction of the psittacosis and feline pneumonitis specific antigens with papain is indicative of the protein nature of these antigens.

Cross complement fixation tests have shown that the psittacosis and feline pneumonitis antigens all react in a group specific manner. The serological relationship among these four antigens was further studied by means of cross absorption tests. It was found that the psittacosis and feline pneumonitis alkali-soluble antigens not only cross react among themselves but are also related serologically to the psittacosis and feline pneumonitis ether-soluble antigens. Absorption of a psittacosis antiserum with either the alkali-soluble or ether-soluble fractions removed group antibody reactive with all four fractions. The destructive effects of potassium periodate and lecithinase on the group serological activity of both the alkali-soluble and ether-soluble fractions is further evidence for the close serological relationship between these fractions.

Although a serological cross relationship between the psittacosis and feline pneumonitis alkali-soluble and ether-soluble antigens was noted, differences in heat stability, hemagglutinating properties, and prozone manifestation were recognized. The ether-soluble antigens agglutinated murine red blood cells in high dilutions and exhibited a prozone in the complement fixation test. The alkali-soluble antigens did neither. The ether-soluble antigens were either partially or totally destroyed by boiling for 30 minutes, while the antigenic activity of the alkali-soluble antigens was enhanced by boiling for the same period of time. Two hypotheses were presented to account for the serological relationship between the alkali-soluble and ether-soluble fractions on the one hand, and the differences in serological properties on the other.

Enzymatic, chromatographic, and spectrophotometric techniques were employed in the identification of the components in the psittacosis and feline pneumonitis alkali-soluble fractions and their relation to the serological activity. The specific ultraviolet absorption properties of the alkali-soluble fractions were determined in the Beckman spectrophotometer over the 2400-3500 Å range. The absorption curves for both viruses showed a maximum at 2600 Å which is primarily a characteristic of nucleic acids. Positive biuret reactions for protein and negative qualitative Molisch tests for carbohydrate were obtained with the alkaline extracts. These fractions were also completely soluble in dilute alkali and not in neutral or acid solution. On the basis of the above preliminary evidence, the psittacosis and feline pneumonitis alkali-soluble fractions were tentatively identified as nucleoproteins. Confirmatory evidence for the presence of nucleoprotein was obtained by paper chromatographic techniques.



The psittacosis and feline pneumonitis nucleoproteins were separated into protein and nucleic acid fractions, and the amino acid composition of the protein fraction was determined by a two dimensional paper chromatographic technique. The amino acid composition was identical for both viruses. The following amino acids were identified on the chromatograms: cystine, lysine, glycine, threonine, proline, valine, tryptophane, phenylalanine, leucine, isoleucine, serine, aspartic and glutamic acids, alanine, methionine, and tyrosine. The amides, asparagine and glutamine, were also present. The only common amino acids not visualized were arginine and histidine.

The purine and pyrimidine composition of the nucleic acids present in the psittacosis and feline pneumonitis alkali soluble fractions was determined by one-dimensional chromatography. Five spots were obtained from both the psittacosis and feline pneumonitis hydrolyzates with  $R_f$  values corresponding to those of standard samples of guanine, cytosine, adenine, uracil, and thymine. The spots were eluted in hydrochloric acid and final identification was made by determining the ultraviolet absorption spectra of the bases. Molar ratios, obtained from the optical densities of the eluates at maximum absorption, showed that approximately two moles of cytosine, guanine and adenine were present for each mole of uracil and thymine. These values confirm the presence of both RNA and DNA in the psittacosis and feline pneumonitis alkali soluble fractions.

In previous experiments it was shown that the group serological activity of the psittacosis and feline pneumonitis alkali soluble fractions could be destroyed by lecithinase. Additional experimental evidence for the presence of lecithin in the alkali soluble fractions was obtained by the following two methods: (1) *Production of lysolecithin*.--The psittacosis and feline pneumonitis alkali-soluble fractions were tested for the presence of lecithin by an enzymatic technique in which lecithin is converted to lysolecithin by the action of lecithinase. Lysolecithin readily lyses red blood cells, and an estimation of the amount of lecithin contained in an unknown preparation may be determined by comparing the hemolysis endpoint with that obtained with a known amount of lecithin. Lecithin was identified in both the psittacosis and feline pneumonitis alkali-soluble fractions by this method. (2) *Determination of choline*.--Lyophilized psittacosis and feline pneumonitis alkali soluble fractions were extracted with an alcohol ether mixture. The dried alcohol ether extract (phospholipid fraction) was hydrolyzed with BaOH, acidified with hydrochloric acid, and extracted with petroleum ether to remove lipids carried over by the alcohol ether extraction. Ammonium reineckate was added to the remaining aqueous phase and choline was removed as the precipitated choline reineckate. Choline was identified by the above procedure

in the phospholipid fractions obtained from the psittacosis and feline pneumonitis alkali-soluble fractions.

Protein, nucleic acid, and lecithin have been identified in the psittacosis and feline pneumonitis alkali-soluble fractions by chromatographic analysis, ultraviolet absorption studies, and enzymatic techniques. The specific serological activity in these fractions was destroyed by papain, and the group serological activity by lectinase. These data suggest that both group and specific serological activity reside in a lecithin-nucleo-protein complex.



## STUDIES ON 5-HYDROXYINDOLE METABOLISM

by HERBERT WEISSBACH\*

The work presented here has dealt with some aspects of the biosynthesis and the metabolism of 5-hydroxytryptamine (serotonin). Recent evidence indicating that this amine plays a regulatory role in the central nervous system has renewed interest not only in serotonin, but also in the various 5-hydroxyindole compounds related to serotonin.

Using a newly developed spectrophotofluorometer, methods have been devised for measuring serotonin in whole blood, 5-hydroxytryptophan (5HTP) in tissues, and 5-hydroxyindole acetic acid (5HIAA) in tissues.

5HTP has been identified as a normal metabolic product of tryptophan in *Chromobacterium violaceum*, an organism that was known to produce a pigment containing a 5-hydroxyindole moiety. This was the first demonstration of this amino acid occurring in nature. However, this organism did not convert 5HTP to serotonin as animal tissues do. The over-all metabolism of tryptophan in this organism was studied.

Radioactive 5HTP was administered to rabbits in order to label the serotonin in the blood platelets, spleen, and gastrointestinal tract. By sacrificing animals at different time intervals, and measuring the rate of disappearance of the radioactivity in the serotonin isolated from the various tissues, it was possible to calculate the half-life of the depot serotonin. It was found that the half-life of the platelet serotonin was about thirty three hours, while the half life of the serotonin in the intestine and stomach was much shorter, ranging between ten to seventeen hours. The half life of spleen serotonin was identical to platelet serotonin, suggesting that this organ stores blood platelets.

The high labelling in the tissue serotonin after the administration of radioactive 5HTP indicated that this amino acid precursor could be used to increase the serotonin levels in animals. This amino acid was administered to dogs, rats, rabbits, and mice, and the serotonin levels in the various tissues measured. 5HTP not only increased the serotonin levels in the normal body depots, but was able to penetrate most of the tissues in the body where it was decarboxylated to serotonin. Thus, tissues such as the liver, heart, kidneys, uterus, etc., which normally contain no detectable serotonin had high levels of this amine. One very important aspect of this work was the ability of 5HTP to

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increase the brain serotonin levels. This increase remains for several hours and is accompanied by pharmacological effects such as tremors, lacrimation, poor coordination of the front limbs, apparent blindness and tachycardia. The effects were similar to those produced by the hallucinogenic indole lysergic acid diethylamide. As had been expected the serotonin formed was quickly converted to 5HIAA which is known to be an end-product of serotonin metabolism that is excreted in the urine. It was found that the central effects of 5HTP could be potentiated by pretreating the animals with mianserin (iproniazid), a drug that is a known inhibitor of serotonin metabolism in animal homogenates. This increase in the pharmacological effects was also accompanied by an increase in the brain serotonin levels.

Although 5HTP decarboxylase had been studied previously in animal tissues, a further study was initiated in order to show that pyridoxal phosphate was the necessary coenzyme for this decarboxylase. This was implied since all other amino acid decarboxylases required this coenzyme. It was found that this requirement could be demonstrated if rat kidneys were used as the source of the enzyme. In all the previous studies guinea pig kidney had been used. The rat kidneys had to be kept frozen for several days in order to show this requirement. The enzyme prepared from these frozen kidneys showed as high as fourfold stimulation upon the addition of pyridoxal phosphate. The effect of pyridoxine on serotonin formation was also studied *in vivo* using pyridoxine deficient chicks. The tissue levels of serotonin in these deficient animals were far below the normal levels. These animals also had a diminished ability to convert 5HTP to serotonin *in vivo* as compared to normal chicks. It is hoped to correlate some of the central effects observed in this vitamin deficiency with low serotonin levels.

The ability of mianserin to inhibit serotonin metabolism in homogenates, and its potentiation of the central effects observed after the administration of 5HTP prompted us to study the effect of this drug *in vivo*. The administration of mianserin to rabbits and rats caused an increase in the brain serotonin levels in these animals. A two- to threefold increase was obtained which usually occurred in the first few hours after the drug was administered. However, repeated doses of the drug had no effect on the brain serotonin level. The administration of mianserin had no effect on the serotonin levels in other tissues indicating a specific effect in the brain. In intact mice, too, mianserin had little effect on the rate of serotonin disappearance after administering serotonin, or on the rate of serotonin formation after giving 5HTP. Although in this latter experiment there was no significant effect on serotonin formation in the whole animal, there was an effect on the brain serotonin levels accompanied by the usual pharmacological effects. It was concluded that except perhaps in specific parts of the brain

marsilid is not able to penetrate to the enzyme site *in vivo*. This was confirmed by the following studies of marsilid *in vitro*. Tissues were removed from animals pretreated with marsilid. Half of the tissue was homogenized while tissue slices were prepared from the other half. It was found that the slices from these tissues could metabolize serotonin for periods up to thirty minutes at the same rate as slices from normal tissues, while homogenates from these same tissues had completely lost their ability to metabolize the amine. Once the tissue was homogenized and its cellular integrity destroyed, the marsilid could exert its potent effect. It could not do this while the tissue was intact, presumably due to its inability to penetrate the cell.

The destruction of serotonin by monoamine oxidase is one of the ways that the body inactivates this amine. Another mechanism is by binding the amine in the tissues. Platelets were known to bind serotonin *in vitro*, although the mechanism of this binding and the role that it plays *in vivo* had not been investigated. The *in vitro* binding of serotonin by platelets is not specific since other amines such as adrenalin, histamine, and dimethylserotonin are also bound by the platelets. It was also shown that the infusion of serotonin or 5HTP to dogs caused marked elevations in the platelet serotonin level. The effect of time, temperature, and serotonin concentration on the *in vitro* binding was studied using dog platelets. The optimum temperature for the binding was about 43°C with very little uptake at 0°C. At low levels of serotonin concentration there was only slight uptake by the platelets, but at levels of 1 mg per ml or higher of the amine in the incubation medium there was large uptake. It was possible to increase the platelet concentration of serotonin ten to twentyfold *in vitro*.

A study was performed on patients with malignant carcinoid, a syndrome in which there is an overproduction of serotonin in the body. Although most of the previous *in vivo* work had employed animals, the exaggeration of the physiologically normal rate of metabolism in this pathological state afforded us a tool with which we could study serotonin biosynthesis and metabolism in humans. As was expected the urinary excretion of 5HIAA was elevated with twenty-four hour values reaching 600 mg as compared to a normal daily excretion of between 2-8 mg. This high urinary excretion of 5HIAA made it possible to develop a simple color test which is now routinely used to diagnose this syndrome. In carcinoid patients, blood serotonin levels were ten times normal with most of the amine found in the platelets. In some of the patients free serotonin was found in the plasma. 5HIAA was also detected in the plasma in small quantities. The urine contained two other distinct 5-hydroxyindoles which we were not able to identify. Since a large percentage of the tryptophan ingested was used by the tumor to synthesize 5-hydroxyindole compounds, a balance study was



performed to correlate tryptophan intake with 5-hydroxyindole production. At a daily intake of 500 mg of tryptophan, it was calculated that 60 per cent was converted to 5-hydroxyindole compounds. Increasing and decreasing the tryptophan intake was reflected in the magnitude of the urinary excretion of 5-hydroxyindole compounds. This balance was the first direct evidence that in humans tryptophan is the dietary precursor of 5-hydroxyindole compounds. This was further confirmed by administering radioactive tryptophan to a carcinoid patient and showing that the urinary 5HIAA was radioactive. Studies were performed on carcinoid tissue which had been frozen after removal from the patient. It had a serotonin content of 0.8 mg per gm and a total 5-hydroxyindole content of 1.1 mg per gm. The tumor was rich in both 5HTP decarboxylase and monamine oxidase, but tryptophan hydroxylase activity could not be detected.

Further studies on 5-hydroxyindole metabolism which are now under investigation have been discussed.



ESCHERICHIA COLI

by DOROTHY MARGUERITE WILSON •

Methyl pentoses are found in a wide variety of natural products, ranging from the cell walls of algae and the bark of trees to the human blood group substances. The sugars occur naturally in glycosidic linkage either with other sugars in polysaccharides, or with noncarbohydrate materials, as in the plant glycosides. L-rhamnose and L-tucose are the main representatives of this group of sugars to be found in nature, although other methyl pentoses and their derivatives are occasionally encountered.

Despite the wide occurrence of the methyl pentoses only limited information is available concerning either the natural synthesis or breakdown of these sugars. In the case of rhamnose an analysis of the products of fermentation of this sugar by *Bacillus rhamnosfermentans* (Klayver and Schnellen, 1937) led to the suggestion that the sugar was split into two three-carbon compounds during the breakdown, but the exact enzymatic pathway remained obscure. It would be expected by analogy with the known metabolism of other sugars, that preliminary reactions would occur during the fermentation of rhamnose before cleavage of the molecule took place, and the present investigation was undertaken to determine the nature of these initial steps in the fermentation of L-rhamnose by *Escherichia coli*.

Washed cell suspensions of *L. cell* that had been grown in a medium containing rhamnose, fermented this sugar with the production of acid and small amounts of gas. Cells grown in a similar medium with the addition of glucose instead of rhamnose did not ferment the latter in a period of two hours. However, an adaptive type of curve was obtained for the oxidation of rhamnose by washed suspension of glucose-grown cells, suggesting that the utilization of rhamnose was an adaptive mechanism and not due to a selective process.

For the study of metabolic steps involved in the fermentation of rhamnose it was desirable to use cell-free preparations of the bacteria. The experiments reported here were carried out with water extracts of acetone powders of *E. coli* grown in the presence of rhamnose.

Anaerobic incubation of rhamnose with such extracts in a bicarbonate buffer (pH 7.6) resulted in the formation of a ketose as measured by

[illegible]

the cysteine-carbazole method of Dische and Borenfreund (1951). This ketose was purified chromatographically and compared with a number of known ketoses, one of which was a sample of synthetic *L*-rhamnulose prepared from *L*-rhamnose by refluxing it with pyridine. The biologically produced ketose and the synthetic rhamnulose were found to have identical absorption spectra in the methyl pentose test of Dische and Shettles (1948). The absorption spectra in the cysteine-carbazole test were likewise identical. They also migrated at similar rates on paper chromatograms in three solvent systems. From these tests it appeared that the sugar formed from rhamnose by the *E. coli* extracts was rhamnulose, and confirmation of this identification was obtained by reversal of the reaction with synthetic *L*-rhamnulose as the substrate. The enzyme responsible for this interconversion of rhamnose and rhamnulose has been called *L*-rhamnose isomerase.

The specificity of the extract with respect to its isomerase activity was tested with a number of different sugars. Of these only *D*-arabinose and *L*-fucose were converted to substrates reacting in the cysteine-carbazole test. It appeared that these conversions were not due to *L*-rhamnose isomerase, as acetone powders prepared from cells grown without added rhamnose showed no rhamnose isomerase activity, but were still active with *D*-arabinose and *L*-fucose.

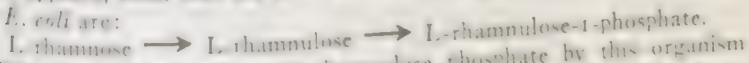
When rhamnose was incubated anaerobically with extracts of *E. coli* in the presence of adenosine triphosphate, a phosphorylation reaction was demonstrated by the manometric method of Colowick and Kalkar (1943). Rhamnulose also was tested by this procedure and was found to be approximately 6 times more active than rhamnose in this system. The possibility existed therefore that rhamnose itself was not phosphorylated but was converted to rhamnulose by the isomerase, with subsequent phosphorylation of the ketose. This hypothesis was tested by investigation of the end product of the reaction when rhamnose was used as the substrate. The reaction mixture was analyzed for phosphate-containing compounds by means of paper chromatography and was found to contain a new phosphate ester which could be separated from the adenosine phosphates and inorganic phosphate as well as from residual sugar. Quantitative experiments showed that the phosphate in this compound could be accounted for by a transfer reaction involving adenosine triphosphate as the donor. The new sugar phosphate was purified chromatographically and was eluted from the paper with water. This purified material was found to give positive tests for methyl pentose, ketose, reducing sugar, and bound phosphorus. It was then hydrolyzed with an acid phosphatase preparation, and the products of hydrolysis were dried *in vacuo* and extracted with methanol in order to obtain the sugar. Chromatography of the methanol extract revealed a sugar corresponding to rhamnulose. No rhamnose was detected.

These studies indicated that the compound formed in the presence of rhamnose, *E. coli* extract, and adenosine triphosphate was a phosphate ester of rhamnulose.

Experiments were performed to determine the ratio of phosphate to sugar in the rhamnulose phosphate. The amounts of inorganic phosphate and free sugar liberated by hydrolysis of the ester with the acid phosphatase preparation were estimated. One phosphate molecule was found for each molecule of sugar.

The problem remained as to the position of the phosphate group on the sugar. The rate of hydrolysis of rhamnulose phosphate in N HCl at 100 C was followed, and in a number of experiments the 10 minute-hydrolyzable phosphorus value was found to be 80-90 per cent of the total phosphorus present. The ease of hydrolysis of the ester in acid suggested that the phosphate group was attached in the one-position of the sugar and that this ester was rhamnulose-1-phosphate.

It appears, then, that the initial steps in the fermentation of rhamnose by *E. coli* are:



The further metabolism of rhamnulose phosphate by this organism has not yet been investigated. The evidence that is available for some other bacteria however indicates that cleavage of the carbon chain of rhamnose into two three carbon units occurs at some stage of its breakdown. This split may occur by an aldolase reaction with rhamnulose phosphate as the substrate, although the only evidence at present concerning this type of reaction (Hough and Jones, 1952) seems to indicate that isomerization of the molecule would be necessary before such a cleavage could occur.



## THE INFLUENCE OF CORTICAL HORMONES ON THE INCORPORATION OF L-METHIONINE-S<sup>35</sup> INTO THE PLASMA PROTEINS

by NICHOLAS VINCENT CARROLL\*

The effect of several adrenal cortical hormones on the incorporation of L-Methionine S<sup>35</sup> into the total plasma proteins has been studied with the aid of the isolated, perfused rabbit liver technique. In addition, a comparison was made of the qualitative and quantitative influence the cortical hormones exert on the various nonprotein nitrogen constituents of the blood.

The rabbit livers were perfused with a 60 per cent whole blood, 40 per cent saline medium supplemented with 292 mg of a complete amino acid mixture. Studies were made over a five hour period. Penicillin was used for the control of bacterial growth during the perfusion. Cortisone, corticosterone, and hydrocortisone were used in this study. The crystalline hormones were dissolved in absolute alcohol and distilled water was added to bring the alcohol concentration to 6 per cent. The hormone concentration was 700 micrograms per ml and this was infused over the course of the experiment at a rate of 3 ml per hour. In order to compensate for the effects of the small amount of alcohol entering the circulation with the hormones, a 6 per cent alcohol solution was infused at the same rate in the control experiments.

The liver perfusion technique used in these studies differed from other perfusion systems reported by having a closed gas circuit which permitted the quantitative measurement of oxygen utilization and carbon dioxide production of the liver. It was found that under the influence of corticosterone and hydrocortisone, there is a decided increase in oxygen utilization and carbon dioxide production by the liver. This effect is especially evident through the four hour time period of the study. After four hours, there is a decrease in the rate of utilization of oxygen and production of carbon dioxide and this is assumed to be due to a decreased concentration of some essential substrate. When oxygen utilization and carbon dioxide production are increased under the influence of cortical hormones, the Respiratory Quotient remains essentially the same as that obtained in livers perfused in the absence of cortical hormone. These observations are not in agreement with the results reported in liver slice

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techniques. It has been reported that the cortical hormones do not stimulate the uptake of oxygen by the liver slices.

Corticosterone and hydrocortisone were shown to produce an increase in the concentration of circulating free amino acids in the perfusate. Without hormone infusion there was a trend toward net utilization of amino acids by the liver.

When hydrocortisone was made available to the perfused liver, urea nitrogen production was greater than that observed when corticosterone was infused. The urea nitrogen levels were also higher than the values obtained when the liver was perfused in the absence of cortical hormones. It was shown that corticosterone does not share the action of hydrocortisone in respect to urea nitrogen production. The levels of perfusate urea nitrogen found when corticosterone was infused were significantly lower than those found in the absence of cortical hormone.

Both corticosterone and hydrocortisone infusion produced an increase in the nonprotein nitrogen levels of the perfusate over that seen in the controls. With hydrocortisone, the ratio of amino acid nitrogen plus urea nitrogen to nonprotein nitrogen was similar to the ratio of these constituents observed in the control perfusions. With corticosterone, this ratio was lower, indicating a considerable fraction of the nonprotein nitrogen was unaccounted for.

Conclusive evidence was obtained in these studies demonstrating the increased uptake of L-Methionine  $S^{35}$  into the plasma proteins. The stimulatory effect of the two cortical hormones was apparent early; there was an increase in the per cent uptake in the first half hour of perfusion. At the four hour time interval the control experiments showed an uptake of 4 per cent of the injected dose of radioactive sulfur. At the same time, 17 per cent had been taken up in the experiments in which hydrocortisone was infused and 20 per cent of the injected dose appeared in the total proteins in the experiments in which corticosterone was infused.

A study was made to determine the location of the sulfur label introduced into the plasma proteins by the perfused liver and also whether this label is the same as that obtained by *in vivo* synthesis of plasma protein in the rabbit. Plasma proteins were labeled *in vivo* by injecting L-Methionine- $S^{35}$  subcutaneously and collecting the blood six hours after the last injection. The proteins were precipitated from this blood and from a five-hour sample of an experiment in which corticosterone had been infused in studying the uptake of L-Methionine- $S^{35}$  into the plasma proteins. The washed proteins were hydrolyzed twenty-four hours with a mixture of hydrochloric and formic acids and subjected to two dimensional paper chromatography on Whatman #1 paper. The dried papers were placed in contact with Ansco High-Speed X-ray film and exposed for fourteen days in order that low amounts of radioactivity in the

amino acids present on the paper would be detected. Upon development of the radioautographs, only one exposed spot appeared on the film. This spot was in the position of L-Methionine  $S^{35}$  as determined by subjecting a sample of labeled methionine to the same treatment. These results indicate that the perfused liver incorporated labeled methionine into the plasma proteins in a manner comparable to the incorporation observed in the intact animal. Under the conditions of these experiments, there was no major conversion of methionine to cystine followed by the incorporation of this labeled cystine into the proteins.

A study was made of the catabolic effect of the adrenal cortical hormones on the plasma proteins using the perfused liver technique. Plasma proteins were labeled *in vivo* with L-Methionine  $S^{35}$  and this labeled blood was perfused through the isolated liver. Studies were made in the absence of cortical hormones and with the infusion of cortisone, corticosterone, and hydrocortisone. It was found that the rate of decrease in specific activity of the plasma proteins was not altered in the presence of the cortical hormones used. It was suggested that, under the experimental conditions employed, the cortical hormones do not have a significant effect on the catabolism of the plasma proteins.

It was shown that the cortical hormones studied increase the level of circulating free amino acids in the perfusate. It was also demonstrated that the cortical hormones appear to have no effect on the catabolism of the plasma proteins. In view of these findings, it is suggested that corticosterone and hydrocortisone have a mild action on the breakdown of liver tissue, making amino acids available to the circulation. A portion of the increased nitrogen excretion observed in animals under the influence of cortical hormones may be due to the breakdown of liver tissue. Results of the present study suggest that the plasma proteins do not contribute to this excreted nitrogen.

The increased incorporation of sulfur-labeled methionine into the plasma proteins observed under the influence of the cortical hormones used in this study could be due to the mass action of increased substrate available for plasma protein formation.

## TISSUE CULTURE STUDIES OF THE PROLIFERATIVE FORM OF *TOXOPLASMA GONDII*

by MARYJANE KATHERINE COOK \*

*Toxoplasma gondii* is an obligate intracellular protozoon which is rapidly receiving increasing recognition in both public health and veterinary medicine. The grave disorders associated with congenital toxoplasmosis and the acquired disseminated clinical infection as well as the role of the organism in the production of chorioretinitis and uveitis offer adequate justification for studies of the parasite. Development of newer tissue culture techniques, which made the elimination of extracellular inhibitory mechanisms present in the whole animal easily possible, led to the use of this tool in studies of the parasite.

The work described in this dissertation is an outgrowth of studies which have been carried on at the Laboratory of Tropical Diseases, National Institutes of Health, on the *in vitro* cultivation of *T. gondii*. These studies were designed to further the knowledge of the cell-parasite balance in this infection, to investigate the mode of action of toxoplasmicidal agents, and to study immunity to *T. gondii* infection.

A survey of the types of cells which may serve as hosts for *T. gondii* was made and the broad spectrum of host cells which will support the growth of *T. gondii* has been demonstrated. The cytopathogenic effect of *T. gondii* in the various cell types has been described and the failure of the protozoon to survive for extended periods in tissue culture of nutrients has been shown. Data were presented to demonstrate that because of poor survival of the parasites in an extracellular situation, it is difficult to obtain high yields of completely viable parasites at definite times after infection of the cultures.

Differences in the rate of growth of toxoplasmas in the various cell systems were shown not to be due to variations in the time required by the parasite for penetration into the cells. Large numbers of parasites enter the cells after only one-half hour of incubation. Other experimental data were presented which indicate that nonsusceptible cells were present in cultures of monkey kidney epithelium. While evidence from direct observation was not available, observations of infected cultures did not indicate that active invasion of the cells by the parasite resulted in death of the cell.

Evidence has been presented to indicate that host cell age has no effect

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on proliferating toxoplasmas in cultures of monkey kidney cells. Experiments designed to determine if *Toxoplasma* produced a toxin were negative.

Experimental data were presented to demonstrate that there is a direct correlation between temperature and the proliferation of *Toxoplasma*. Evidence was obtained to show that *Toxoplasma* may multiply within a fairly wide range of temperatures in tissue cultures. Making use of this information, strains of the parasite have been maintained in tissue cultures at room temperature, thus eliminating frequent media changes and transfers.

Prolonged serial passage of newly isolated strains of *Toxoplasma* in tissue cultures of monkey kidney cells did not result in an increase in virulence of these parasites for mice or hamsters.

Colchicine-arrested cultures of monkey kidney were equally as able to support the growth of *Toxoplasma* as nonarrested cells and the colchicine-treated cells were shown to harbor more parasites per cell than normal cells.

Data have been presented to show that penicillin, streptomycin, and mycostatin have no effect on the proliferation of *T. gondii* *in vitro*.

In an effort to elucidate the mode of action of pyrimethamine against *T. gondii* *in vitro*, and perhaps to determine some of the metabolic pathways present in the parasite, various studies were made. The remarkable effectiveness of pyrimethamine against *Toxoplasma* was clearly shown; an exposure of four days to a concentration of 0.25 gamma ml of the drug was sufficient not only to prevent lysis of the cultures but to clear the cultures of the parasite. Experimental data to show that pyrimethamine has no effect on nonproliferating toxoplasmas have been presented. The toxicity levels of pyrimethamine in tissue cultures of monkey kidney epithelium were determined. Data were offered to show that pyrimethamine has no effect on the ability of *Toxoplasma* to enter treated tissue culture cells, but that even after short exposure of the cells to the drug conditions were not favorable for proliferation of *Toxoplasma*. Treatment with pyrimethamine could be delayed for 48 hours after infection of the tissue cultures and still be effective in clearing the cultures of the protozoon. The age of the host cell was shown to have no effect on the ability of the drug to clear the tissue cultures of the parasite. The synergistic effect of pyrimethamine and sulfadiazine against *T. gondii* was confirmed *in vitro* and microscopic studies of the effect of pyrimethamine on *Toxoplasma* have been presented.

It was demonstrated that storage of pyrimethamine occurs in tissue cultures of monkey kidney epithelium treated with this drug, and the conditions necessary for the storage phenomenon to occur were investigated and defined. Chick embryo heart explants, HeLa cells, and human intestinal cells were all shown to store pyrimethamine in levels inhibitory



to the parasite. Mouse mince cultures and KB cells possessed a slight ability to store pyrimethamine, while conjunctival epithelium (Chang) showed no evidence of drug storage. The storage of drug in these cells was determined by the results of challenge of treated cultures and by microbiological assay.

Drug-resistant organisms offer an excellent tool for studies on the mode of action of a drug. In the course of these investigations a pyrimethamine-resistant line of *Toxoplasma* at least 64 times more resistant than the parent strain of the organism was developed *in vitro*. This line was produced by exposing the parasite to increasing sublethal dosages of the drug. The drug-resistant properties of this line of *Toxoplasma* could not be confirmed *in vivo*, but the resistant nature of the parasite was retained for at least three months when the protozoan was maintained in the absence of the drug and tested *in vitro*. A pyrimethamine requiring strain could not be developed. Mutation leading to drug resistance has not been demonstrated. Evidence to show that pyrimethamine-resistance should offer little difficulty in the treatment of toxoplasmosis was presented.

Antagonism experiments with pyrimethamine suggest that the drug acts on the metabolic pathways involving para aminobenzoic acid, folic acid, and folinic acid. Adenine, guanine, uracil, cytosine, and xanthine showed no antagonistic activity to the toxoplasmaidal activity of pyrimethamine. Thymidine showed some antagonistic activity.

A system has been described to test other compounds involved in the metabolic mechanisms leading to multiplication of the parasite in tissue culture.

Studies to determine if pyrimethamine could be reversed by various purines and pyrimidines led to the accidental finding that adenine, adenosine, adenylic 5 phosphoric acid, adenosine triphosphate, and xanthine possess the ability to delay the cytopathogenic effect of *T. gondii* in tissue cultures. It was shown that adenine was not stored within the host cells when concentrations of 2.0 mg per cent or less are used and that the effect of this purine is demonstrable only when the chemical is present in the medium. The effect of the adenine was not due to direct toxicity and was demonstrated only against proliferating toxoplasmas. The ability of adenine to cause a delay in cellular degeneration of host cells and a slowing of mitotic division of the parasite and the possibility of the conversion of adenine into an actively toxic substance, which is rapidly degraded within the host cell, has been discussed. It was noted that adenine caused a decrease in the number of tissue culture cells showing mitotic division. The adenine activity was not reversed by the purine antagonists benzimidazole or 2,6-diaminopurine and these antagonists themselves were shown to have activity similar to adenine. Adenine in concentrations as low as 0.01 mg per cent, showed some

effect on cellular degeneration of tissue cultures due to the proliferation of *Toxoplasma*. Adenine did not interfere with the penetration of toxoplasmas into host cells, but produced a delay in cytopathic effect in tissue cultures infected with a light inoculum of toxoplasmas even when administered as late as the fourth day of infection.

Experiments to determine the M.E.D. of sulfadiazine against *T. gondii* growing in tissue cultures were described. Even concentrations of 100 mg per cent failed to free the tissue cultures of toxoplasmas but the rate of proliferation of parasites in sulfadiazine-treated cultures was much lower than in nontreated cells. It was demonstrated that sulfadiazine does not act by interfering with the penetration of toxoplasmas into host cells in the tissue cultures. One of the soluble dihydrotiazines has also been used effectively to clear tissue cultures of monkey kidney cells of a *Toxoplasma* infection.

The availability of a tissue culture system in which cells could be infected with viable actively metabolizing organisms and then cleared of the infection with a suitable drug led to the use of this type of tissue culture system for some *in vitro* studies on cellular immunity. Studies to determine the appearance of *de novo* cellular immunity in tissue cultures of monkey kidney cells yielded only equivocal results. It was not possible to show antibody production in cultures of kidney, lymph node, spleen, and macrophages derived from immunized monkeys. The failure of immune serum to act against intracellular toxoplasmas proliferating in tissue cultures derived from immune and nonimmune animals was described.





The domestic rabbits were eight- to nine-week old New Zealand whites bred at the National Institutes of Health.

#### EFFECTIVENESS OF STORED FIBROMA TUMORS AS A SOURCE OF THE VIRUS

It was found that, in general, virus maintained its virulence better when the infected tissues were stored intact rather than as a suspension. Cottontail tumors that had remained intact and infectious for mosquitoes for at least 2 months maintained their virulence for over 2 years when kept in the deep freeze ( $-20^{\circ}\text{C}$ ). Up to 18 months, the virus maintained its virulence equally well in a deep freeze and in a dry ice cabinet ( $-70^{\circ}\text{C}$ ). The titer of stored tissue could be restored by passage through weanling domestic rabbits and enhanced by passage through suckling domestic rabbits.

#### MECHANISM OF FIBROMA TRANSMISSION

The mosquitoes *Aedes aegypti*, *Aedes triseriatus*, *Culex pipiens*, *Culex quinquefasciatus*, and *Anopheles quadrimaculatus* were all found to be efficient vectors. The reduviid bugs, *Tritoma infestans*, *Tritoma phyllosoma pallidipennis*, and *Rhodnius prolixus* were all capable of transmitting the virus by bite 14 days after their infective meal on cottontail fibroma. *Rhodnius prolixus* was able to transmit from both cottontail and domestic rabbit tumors both by interrupted meals and after delays up to 22 days after the infective meal. Bed bugs, *Cimex lectularius*, were capable of transmitting virus by interrupted feeding and by delayed feeding 7 days after the infective meal. Inoculation of suspensions of mouthparts and abdomens of bedbugs that had fed on fibromas also induced tumor growth. The chigger mite, *Trombidium splendens*, thought to be an arthropod possibly involved in the natural transmission of fibroma virus, was not shown capable of transmitting the disease in laboratory trials. Because of the nature of the feeding habits of the various stages of this mite, transmission would have to be trans-ovarial. Since its life cycle was relatively long and many technical difficulties existed in confining the mites on tumors for 3 days in order to infect them, only three experiments could be carried out.

When groups of *Aedes aegypti* fed on infective tumors, about 65 per cent of the individuals picked up virus. In order to get consistent results in titrating suspensions of heads of mosquitoes that had fed on tumors, 10 or 20 heads were used in a pool since 1, 2, or 5 heads gave erratic results. Mosquitoes that had been given a blood meal sometime prior to their infective meal were no more capable of transmitting virus than those mosquitoes that had not had such a blood meal.

It had been said by some investigators that mosquitoes merely served



as "flying pins" when transmitting rabbit myxoma. In experiments designed to show whether this was also true with the related fibroma virus, it was found that although mosquitoes appeared to serve as pins when transmitting virus by interrupted feeding, they did not lose their ability to transmit within a short time after being infected, as did pins after contamination. Mosquitoes whose mouthparts had been washed with virulent virus also were found unable to transmit. In another experiment, mosquitoes were induced to feed through the fibroma-moistened skin of a susceptible rabbit. These mosquitoes also were unable to induce tumor growth. The results of this group of experiments indicated that the virus probably not only clung to the exterior of the mouthparts of the mosquitoes, but also had to lodge somewhere between the stylets in order to be transmitted by the mosquitoes. It may also mean that transmitting mosquitoes actually pick up infected tumor cells, their mouthparts serving as a tissue culture medium.

Contrary to the findings of investigators of myxoma virus transmission, it was found that a large amount of fibroma virus was not excreted in the feces of the vectors. Unlike myxoma virus which is systemic and therefore taken up with the blood by mosquitoes, fibroma virus is restricted to the tumor tissue cells themselves. Although some fibroma virus may pass through the digestive tract of the mosquito, most of it appears to lodge on and around the mouthparts; myxoma virus probably passes through the digestive tract with the ingested blood.

At varying intervals after *Aedes aegypti* fed on an infective cotton-tail tumor suspension or pooled body parts of equivalent groups were inoculated into the shaved flanks of a normal albino rabbit. Virus was recovered principally from the stylets and cibarial region, with less from the head capsule, and only a small quantity from one of the abdomen pools. In almost all fibroma experiments in which virus was recovered from the abdomens of mosquitoes, these mosquitoes had fed on older tumors of domestic rabbits, on suckling rabbits, or on irradiated domestic rabbits. The high concentration of myxoma virus in the abdomen of mosquitoes after their infective meal, as demonstrated by other workers, probably reflected the high viremia associated with the disease; when fibroma virus was found in large amounts in the abdomens of arthropods, as was the case with the redwings, it was usually several days or weeks after their infective meal.

In electron microscope preparations and photographs of infected mosquito mouthparts, virus particles could not be located, probably as a result of having been washed out during the processing. However, the structure of the mouthparts did become clearer. Not only can the recurved teeth of the maxillae serve for lodgment of virus, but the interior surface of the labrum also appeared particularly suitable.

## MULTIPLICATION OF FIBROMA VIRUS IN ARTHROPODS

In biological transmission of a disease by arthropods, the pathogen passes through the tissues of the vector; in mechanical transmission, the pathogen is carried purely mechanically by the vector. Although in most of the arthropod-borne virus diseases transmission appears to be biological, in the insect-borne pox viruses of animals transmission appears to be mechanical. Myxoma virus, to which fibroma is related has been shown by one group of investigators to be mechanically transmitted; two other groups working with myxomatosis offer some evidence for biological transmission, principally the ability of the virus to survive long periods in the arthropod vector. Since virus proliferation in the mosquito was considered to be the best indicator of biological transmission, several experiments were performed to determine whether this was involved in rabbit-to-rabbit passage of fibroma virus by arthropods.

In each of 35 experiments, aliquots of a large number of infected arthropods were dissected at intervals and their body parts titrated in domestic rabbits. If the periodic titrations showed a decline of virus titer soon after the infective meal and a subsequent rise, virus multiplication was considered a possible explanation. In about half the experiments, there were indications of virus proliferation. Furthermore as a result of periodic inoculations of the head pools, the number of days required for maximum tumor development to occur increased after the day of infection and then gradually decreased. *Anopheles quadrimaculatus* gave similar results. The virus remained viable in the reduviid bugs as long as 25 days and in some experiments, suspensions of the mouthparts were negative on the day of the infective feed but positive a few weeks hence. Although only half of the numerous experiments gave indications of possible virus multiplication, it was found that, in general, virus could persist in the arthropod mouthparts for as long as 35 days and could be transmitted even after several intervening blood meals between the infective and final feedings.

In another series of experiments a large group of infected mosquitoes was fed at intervals on test rabbits, and after each refeeding, a suspension of a mouthpart pool of 20 of the group was titrated in a test rabbit. In one of the experiments, after four refedings the virus titer of the mosquito head pool was approximately that of the head pool immediately after the infective meal. Also, with each refeeding, the proportion of tumors produced per mosquito feeding was not reduced, but rather increased. Although it is difficult to be certain whether each tumor was the result of the bite of a single mosquito, or whether several tumors might have resulted from successive probes of one mosquito, the results appear to indicate possible virus proliferation.

A small number of individual infected mosquitoes were induced to

make successive probes in a recipient test rabbit with the expectation of reaching a point close to virus extinction. If after an intervening period a second series of probes again were to induce tumors, virus multiplication might well be suspected. Probes of most of the mosquitoes resulted in sporadic and haphazard tumor formation. With some of the mosquitoes both series of probes consistently resulted in tumors, never indicating a definite drop in virus concentration. There were no definite indications of virus multiplication.

In another attempt to establish a technique for demonstrating whether multiplication of fibroma virus occurred in the arthropod vector, mosquitoes were injected with a known volume of virus suspension and these were titrated in groups at intervals after the inoculation. Virus was isolated from the head capsule, thorax, abdomen, and legs, but not from the mouthparts, soon after the infections, but disappeared rapidly from all these body regions. The technique showed that under the circumstances fibroma virus could not reach the mouthparts of infected mosquitoes nor could it persist in the hemocoel.

All experiments designed to pass fibroma virus by serial feeding of mosquitoes to other mosquitoes yielded negative results. It was shown that mosquitoes were also unable to pick up virus by feeding on a virulent virus suspension poured over a cotton pledget. However, in a preliminary study, mosquitoes were found capable of picking up virus from a cell-free extract offered in the same manner.

Suspensions of infected mosquito mouthparts were kept at room temperature up to 92 days without great loss of virulence. It was apparent that fibroma virus is very stable, which, at least in part, accounts for the ability of infected mosquitoes to remain infective over such long periods of time.

#### RELATIONSHIP OF FIBROMAS TO MOSQUITOES

The duration of rabbit fibromas seems to depend on several factors among which are age of the host, strain of rabbit, effect of physical and chemical agents, dose of virus employed, and the origin or mode of inoculation. The fibromas of domestic weanling rabbits usually reached their peak in 10 to 12 days and thereafter crusted and regressed, completely disappearing by 16 to 20 days. These tumors did not become infective for mosquitoes. The development of suckling domestic rabbit tumors followed closely that of weanlings up to 10 days, but then continued until about 19 days with damaged areas commonly regenerating. These tumors frequently became infective to arthropods after 10 days and remained so until the death of the rabbit (usually within 3 weeks). Tumors induced in young cottontails became apparent in 7 to 8 days, reached maximum size in about 3 weeks, and then persisted for about



2 to 3 months. The cottontail tumors over 35 days old were always found to be infective for mosquitoes and to remain infective as long as they persisted. Tumors tested for infectivity when 15 to 35 days old also were frequently infective and in one instance, a 7-day tumor was infective. Tumors of cottontails proved equally infective to reduviid bugs and bedbugs. Just as papilloma virus can be transmitted from cottontail to cottontail rabbit and from cottontail to domestic rabbit, but not from domestic to domestic or domestic to cottontail rabbit, so mosquitoes can transmit fibroma virus from cottontail to cottontail and cottontail to domestic rabbit, but usually not from domestic to domestic or domestic to cottontail.

It was previously thought that some type of tumor "maturation" necessary for infectivity to arthropods, occurred in the cottontail tumors but not in those of domestic rabbits. The difference in infectivity could not be related to the titer of the tumors alone since both the cottontail and domestic tumors had similar titers when the former were infective and the latter noninfective. By removing the top layer from an eight-day noninfective fibroma of a domestic rabbit, the basal portion of the tumor was shown to be quite infective for mosquitoes. The upper portion of the tumor that was removed titrated only  $10^4$  while the titer of the basal portion was  $10^7$ . Thus it appeared that infectivity was related to the presence of virus in the area where the mosquitoes were feeding. Domestic rabbit tumors usually regress before the virus reaches this area. Why the tumors regress when they do in domestic rabbits is still unknown.

The tumors of weanling domestic rabbits were made infective for arthropods by treatment of the rabbit, prior to virus inoculation, with methylnholanthrene or 1, 2, 5, 6 dibenzanthracene. Cortisone did not appear to alter their infectivity. Total body X radiation of domestic weanlings prior to infection greatly prolonged tumor development and those over 26 days old were all found infective for arthropods. If tumor tissue was passed through mouse brain and the brain suspension inoculated intracutaneously into the skin of another rabbit, the resulting tumors endured longer than those induced by rabbit tumor suspensions and were also infective for arthropods.

Histological studies showed a positive relationship between the structure of a fibroma, the presence of large cytoplasmic inclusions in its epithelium, and its arthropod infectivity.

#### IMMUNITY TO FIBROMA VIRUS INFECTION

Some investigators had found that cottontail rabbits were immune to reinoculation with fibroma suspensions 4 days after their initial infection, although neutralizing antibodies were not found until 15 days after inoculation and did not reach their peak until about 2 to 3 months, which



corresponds to the peak in virus infectivity titer. Other investigators found that immunity in domestic rabbits was developed from 2.5 to 5.5 days after infection, with neutralizing antibodies appearing at 5 days. In irradiated animals immunity developed in 11 to 15 days. In the present study, the sera of two cottontail rabbits and three domestic rabbits were taken prior to infection and at 7, 20, 51, 112, and 152 days after infection. The tumors of the domestic rabbits regressed within 17 days and those of the cottontails within 35 days. From serum neutralization tests it was found that antibody appeared in the blood of the cottontails 7 days after infection, reached a peak at 51 days and then started falling, none being indicated 152 days after inoculation. In the domestic rabbit there was evidence of antibodies in the serum within 7 days of infection and these reached their peak in 20 days. They were less apparent in 112 days and seemed to disappear by 152 days. Challenge of the five animals about 4 months after disappearance of their fibromas led to development of large tumors in 2 days in the domestic rabbits, and to a definite reddening of the sites of inoculation in the case of the cottontails. The tumor like tissue did not show virus content on inoculation into a test rabbit. Histologically the tumors showed the type of inflammatory reaction found in the early stages of fibromas as well as in hypersensitive reactions. Sera were prepared prior to challenge and 2, 6, 8 and 22 days after challenge. Neutralization tests showed marked virus neutralization by the serum taken 2 days after challenge and complete neutralization by the serum taken 6 days after. This rapid rise in antibody is reminiscent of the anamnestic reaction experienced in revaccination with vaccinia virus. It is also found in most bacterial diseases and in numerous fungal, protozoal, and virus diseases.

In a series of experiments, it was shown that numerous virus inocula of high concentration will not affect the development of tumors in the same animal resulting from inocula of low concentration. Also, that the size reached by a tumor is dependent on the amount of virus present in an infecting dose. However, the mechanism involved in the inhibition or continued development of tumors is not known.

On the 4th, 7th, 16th, and 31st day after intracerebral inoculation of fibroma virus into one day old mice the virus was successfully demonstrated by titration of the brain tissue of pairs of the mice in the skin of test rabbits. Comparison of the titrations indicated the possibility of virus multiplication but too few tests were performed to ascertain this. In one experiment, three mouse-to-mouse passages were accomplished.

#### PAPILLOMA STUDIES

Scarification of suspensions of papilloma tumor tissue that had been stored for two years at  $-20^{\circ}\text{C}$  resulted in good development of papillomas in both cottontail and domestic rabbits.

All attempts by previous investigators to transmit papillomas by arthropods were fruitless except for one positive transmission by nymphs of the rabbit tick, *Haemaphysalis leporis-palustris*, that had partially fed on the base of a tumor. In the studies reported in this dissertation, papillomas were successfully transmitted to both domestic and cottontail rabbits by the feeding of mosquitoes and reduviid bugs four days after their infective meal. Scarification of their infected mouthparts into the rabbit skin similarly induced tumor growth.

*Aedes aegypti*, *Anopheles quadrimaculatus*, and *Rhodnius prolixus* all induced papillomas in domestic and cottontail rabbits by feeding through their virus-moistened skin. This could not be achieved with fibroma. Possibly mosquitoes feeding directly through fibromas draw up a large number of virus particles within the stylets and these are dislodged when the mosquitoes again feed on a recipient rabbit. When feeding through the virus-moistened skin, however, virus may only cling to the exterior of the mouthparts and be wiped off during feeding without reaching the susceptible cells. Since more superficial tissue is involved in papilloma infection, mosquitoes probably can transport this virus to the susceptible cells involved.

Papilloma virus has also been transmitted from secondary soft, cystic growths that arose on papillomatous cottontails and were apparently noncontiguous with the papilloma horns. These cystic growths appeared similar to ones reported in the literature as precancerous, and which finally become malignant and often metastasize. Should these growths finally develop into cancers, and should arthropod transmission from them be successful at such a time, it would mean that arthropods could serve as a hitherto unavailable means of extracting virus supposedly in a "masked" form. This would indicate the need to give more attention to the possibility that other mammalian tumors have occult virus as their provocative and actuating causes.

## A STUDY OF SELF-OTHERS ATTITUDES IN A NORMAL AND AN ABNORMAL POPULATION

by JACOB VICTOR GOLDER\*

This study was designed to investigate (1) the manner in which individuals perceive themselves and others in their home, social-recreational, and vocational roles, (2) the relationship between these percepts, and (3) the role these interrelationships play in adjustment. More specifically the study was concerned with testing four hypotheses related to the role played by attitudes toward the self and attitudes toward others in behavior and psychological adjustment.

The research instrument used in this study was a group of 80 statements (Survey of Personal Opinions or SPO) specifically developed for this study and designed to tap attitudes toward the self and attitudes toward others in the three areas of social interaction mentioned above. This list of statements was administered to a normal and abnormal group consisting of 50 male subjects each matched, insofar as possible, for age, marital status, and educational level.

The statistical analysis of the data was concerned primarily with the intercorrelations of the six scales constituting the SPO and in testing the significance of differences between means for the normal and abnormal groups on the scales. The major findings resulting from this analysis were:

1. Attitudes toward self in general and attitudes toward others in general were positively and significantly related in both the normal and the abnormal populations.
2. When the self-others attitudes were differentiated into three areas of social interaction—work, family and home, social-recreational—there was a positive and significant relationship of these attitudes within and between each interaction area.
3. Self-others attitudes of the normal group were significantly more positive than those of the abnormal group in all of the areas tapped by the questionnaire.
4. Responses to the questionnaire significantly differentiated the two groups.
5. Extreme negative self-others attitudes were indicative of maladjustment.
6. A paper and pencil sampling of self-others attitudes is a feasible approach to group screening for emotional problems.

The findings were discussed generally in terms of their implications

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for personality theory and for practical applications in psychological testing. It was pointed out more specifically that the findings of this study added to the body of evidence which indicates that self others attitudes have significance for personality theory, for the study of interpersonal relationships, and for practical problems in various applied fields of psychology, e.g., psychology testing, mental health, and therapy. The findings also supported the proposition that the way he "looks at" others and behaves toward them. The nature of these attitudes—positive or negative—has a bearing upon the individual's adjustment and can, therefore, serve as valuable clues in personality description and the prediction of behavior.

It was concluded that the study of self others attitudes could be conceived as an approach to the study of individual personality differences. Increased knowledge derived from refined and systematic research in the area of self others attitudes could have significant theoretical and practical implications. Such knowledge could provide a better basis for an understanding of the individual in relation to his interpersonal environment and for interpreting and evaluating the uniqueness of individual personalities.



## SOCIAL PSYCHOLOGY AND NATIONALITY CHARACTERISTICS

by ALFRED OLIVIER HIRSH, JR.\*

Many political scientists in the past—Aristotle and others—have viewed government as part of the social process. Most twentieth century political scientists—international relations specialists have focused on the more formal structure of politics within and between countries and have devoted relatively little attention to understanding human behavior.

The behavioral sciences, developed in isolation from political science—international relations, have therefore not contributed to the understanding of political behavior to the degree commensurate with their current funds of theories, methods, and knowledge. The number of political scientists—international relations specialists interested in applying developments in the behavioral sciences to the study of political behavior must be increased substantially if there is to be effective collaboration; there must be a similar increase in the representatives of the behavioral fields who will attempt to integrate into their own thought and research the fundamental behavioral problems of political scientists—international relations specialists. Despite some hopeful evidence to the contrary, interaction between the various branches of the behavioral sciences—on the one hand and historians, political scientists, international relations specialists, geographers, lawyers, and philosophers on the other is still very underdeveloped.

This lack of communication stems partially from differences in the methods and theories employed by the two groups of disciplines. The behavioral sciences employ whenever possible the scientific method of the physical sciences, shifting to more descriptive, intuitive, speculative, or impressionistic approaches only where the complexity of the behavior under study places it beyond these empirical techniques. Behavioral science, in short, uses procedures that are largely repeatable, quantifiable, and objective. Such procedures are capable of putting relatively limited theories of the empirical behavioral sciences to test. The high reliability and validity of data thus obtained results in cumulative knowledge. The other group of disciplines places less emphasis on development of increasingly rigorous methods and more emphasis on original individual contributions to understanding of human life. The behavioral scientist must often limit the problems he will investigate because of the inability of the scientific method at its current level of development to deal with complex behavior. Historians and political scientists—international relations

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tions specialists are often willing to employ less rigorous methods when these seem necessary to study complex behavior. Further, the behavioral sciences favor research in which several disciplines collaborate on each problem, with the nature of the problem determining the particular methods used in studying it. In the other group of disciplines, the inventiveness and sensitivity of the single scholar, working alone, is the normal source of progress. Due to these and to other differences in their methods and ways of thinking, the two groups of disciplines have built up different vocabularies that separate them even further.

This situation has had unfavorable effects in many areas, among them the study of political behavior, in which political scientists have tried to work out their own approach and to come to their own conclusions without taking sufficient cognizance of behavioral science research on human behavior in general. Political behavior, it is clear, must be studied in the context of all major aspects of behavior in society, as well as from the frame of reference of political institutions. Effective research on the behavioral level of politics will thus require much greater cooperation among these disciplines. This demands that political scientists familiarize themselves with the concepts of the behavioral sciences, a process that must begin in graduate school and continue through reading in literature of these other disciplines and through cooperation on the same research problems. Political science should regard the behavioral sciences as having equal potential importance with other disciplines that contribute insights about politics, such as the study of history and of law.

Though agreement among political scientists international relations specialists on a more systematized body of knowledge, method, and theory would form a very useful point of departure for defining the problems on which research on political behavior should focus, there is little likelihood of such agreement in the near future. There is greater possibility of agreement on a more practical level, that is, on a synthesis of behavioral problems faced by political science international relations with existing research findings in the behavioral sciences. Such a fitting together of concepts and of materials from disparate sources would, of course, demand compromises among all involved, as well as efforts by each to understand the theory, method, and knowledge of the others. This constantly changing synthesis would, naturally, require close, continuing rapport in the future among the several disciplines.

Following such a synthesis, the behavioral sciences and political science international relations could together define goals for a number of years ahead for research on political behavior. This definition of goals should take into account both (1) the questions that political science international relations felt were most crucial to the development of its theory and to its understanding of political phenomena and (2) the state of theory, method, and knowledge in the relevant behavioral

sciences. Research to follow would be based on this general system. Hypotheses would be laid down in researchable terms and the results of experiments based thereon would be interpreted from the broadest possible theoretical frames of reference and for the maximum range of implications to both political behavior and to behavior in general. Further studies of political behavior would be modified in keeping both with the findings of pertinent research and with developing theory in the behavioral and political-international relations sciences.

The part of this general methodological problem that has most interested this writer is the study of nationality characteristics, or of the uniformities in behavior applicable to the population of a national area, or to parts thereof. Several groups among the behavioral scientists have produced studies of national behavior. One of the most discussed is the "national character" research of the psychoanalytically oriented cultural anthropologist, psychiatrist, and psychologist. Among the shortcomings of this method are (1) the impressionistic nature of the data and conclusions and the lack of repeatable, controlled, experimental techniques; (2) the limitations inherent in orthodox Freudian theory and methodology, which is, after all, only one of many bodies of theory and methodology on personality and personality development; (3) the assumption that there are important uniformities of behavior unique to most of the members of a modern complex nation, and lack of agreement on the nature of these uniformities; and (4) emphasis on typical behavior in a culture with correspondingly little attention to deviates from these supposed central tendencies.

Any effective long-range approach to national behavior must be interdisciplinary, involving the participation of political science with the behavioral sciences starting with the definition of the problem and ending with the interpretation of the results and the definition of further hypotheses suggested by these results. No one body of theory or of technique is sufficient to give maximum comprehension and prediction of behavior in the national area. It is doubtful that the behavioral sciences will be able to agree on a single system of theory and method in the foreseeable future. It may be argued that agreement on any such system would tend to restrict rather than to encourage the creative thought essential to increasing penetrating research on human behavior. Among the several behavioral sciences there are major obstacles even to *ad hoc* cooperation for study of a single behavioral problem.

In this interdisciplinary study of national behavior, social psychology can and should take an important role, which will vary with the problem under study. Social psychology is stressed here because it specializes in research on individual personality and its development through social learning, areas that are essential to the study of nationality characteristics.



Social psychology can bring several important emphases to the study of national behavior. Of the sciences focusing on social man, it is the one most oriented toward the experimental method. It is the most convinced that progress in the understanding of behavior requires constant efforts to develop new, more rigorous methods. Its concern with improving methods is at least as great as its interest in the subject matter, the results within the individual or social interaction. Among the possible contributions of social psychology to research on national behavior that spring from this emphasis are the evolution of a body of theory which changes with the available body of cumulative, empirical knowledge; concern with the range of behavior in a given group as well as with the typical or average behavior; ability to study the relationships among human variables within the individual; ability to examine scientifically behavior of specified types of individuals in tightly defined situations and to compare this behavior over time; and pragmatic openness to theory from any source that can produce useful scientific results. The social psychologist feels, moreover, that the nation is too large a group in which to investigate uniformities of behavior for most purposes, and that the best possible prediction will be based on unities discoverable within much smaller groups, such as the subculture.

One must be careful to consider each method used by social psychology to implement these emphases as only one of a number that may add to understanding of personality in society, each having its shortcomings and advantages. Although such terms as "opinion", "attitude", "stereotype", "perception", "motivation", "personality structure", and "value system" are employed in conjunction with one method or another of social psychology, the student of national behavior must bear in mind that these are somewhat artificial abstractions whereby the personality is stridled from a single frame of reference. The basic target for analysts is the total personality and its development through social experience, and these abstractions must be considered simply as tools, each one alone relatively narrow, for assessing personality and personality development.

Two other behavioral sciences, sociology and cultural anthropology, can each teach and learn from social psychology in national behavior research. Each of these three sciences studies the same behavior on a different level of analysis and within a different frame of reference. Social psychology brings to the other two sophistication in analysis of individual personality and behavior. It is able to provide insights to the others from study of the individual and of manifestations within cultural, sub-cultural, community, and group norms and pressures within the individual. On the other hand, sociology and cultural anthropology define the phenomena operating on the individual from without, that is, the social pressures, social institutions, and sub-cultural norms



brought to bear on him; the relationships of his statuses to other statuses, to the group, and to the society in general; the communication networks within and between social strata and subcultures; and the idiosyncracies of behavior and of social organization in one community as compared with others. Insights from these manifold disciplines can aid social psychology in describing more useful hypotheses for its research and in interpreting the results of research for the broadest possible implications. Sociology and cultural anthropology can bring to social psychology their understanding of behavior on the supra-individual level, thereby correcting any overemphasis of social psychology on individual behavior.

The relationships between social psychology and political science-international relations necessary for effective research on national behavior are part of the larger problems of relationships between political science-international relations and the behavioral sciences in general and of improved interdisciplinary cooperation among the behavioral sciences themselves. The major generalization that should be carried from this discussion is that most national behavior research will require, in the absence of any single sufficient approach, a complex collaboration among the several disciplines concerned.

The analysis of opinions is probably the social psychological approach best known to the political scientist and international relations specialist. Opinion research methods, which do not penetrate beyond the verbal behavior of the individual in specified situations, are relatively superficial. However, since opinion research can assemble data on a large sample of individuals presented with a wide variety of stimuli, it does give social psychology the ability to check changes within representative individuals in the nation, society, or subculture. It permits calculation of norms for large populations and of deviations from those norms. It can pinpoint opinions and individuals holding them for more thorough investigation closer to the personality than opinions. If the social psychologist can supplement such data on individuals with other, more penetrating methods, the opinion poll can indicate trends in the society as a whole and in parts of it. One difficulty is that the correlation of overt behavior with verbal reactions to opinion polls is often low, and prediction of action is therefore difficult. However, opinion polling techniques can be designed so that they approach personality inventories in the number of areas of the personality investigated and in the depth to which the behavior of the individual is analyzed.

Attitude research is normally designed to reach deeper into the personality than is opinion research. Some attitudes are determinants of, or are highly correlated with, a number of other attitudes that are basic to the individual's adaptation to major social problems presented to him. These are termed "pivotal attitudes" and, when they are closely

associated, "attitude syndromes". Studies of these syndromes can be designed to approach the span and depth of personality inventories.

The cross-cultural comparison of opinions, attitudes, stereotypes, attitude syndromes, and values is still in its infancy, because social psychology and the other behavioral sciences have developed empirical techniques largely on Anglo-Saxon populations, particularly in the United States, and because it is difficult to perform equivalent research in two or more disparate societies. However, the relatively few cross-cultural studies of these variables have established certain general principles: studies should compare individuals playing similar roles or occupying similar statuses in the several societies; a compromise must usually be made between absolutely equivalent instruments for the several societies and instruments capable of probing unique attributes of behavior in each society; behavioral scientists performing research in the different cultures should have approximately the same training and precisely the same orientation for the study at hand; and such cross-cultural research should include more than just attitude measures and other non-ethnic techniques. Further, due to the cost of cross-cultural research, studies must often be limited to a single society, but when these incorporate idiographic as well as nomothetic methods, they can yield useful data and conclusions about behavior in specific socio-political situations.

The one most penetrating group of concepts and of methods in social psychology which has evolved in recent years is dynamic psychology, the basic origins of which were in psychoanalysis. However, dynamic psychology as integrated into social psychology is a product of the interaction of psychoanalysis with cultural anthropology's cross-cultural research conclusions, psychiatry's experience with the mentally ill in a wide variety of cultures, empirical sociology's investigations of social norms and other social forces acting on the individual, and psychology's empirical evidence relevant to psychoanalytic theory and to personality development in general. Its freedom originates in dynamic psychology's probe into the basic adaptive processes of the individual, particularly the emotional sources of his behavior. Despite the occasional friction between social psychology and psychoanalysis, the gradual empirical testing of psychoanalytic theory and the continuing compromises by both disciplines required for studying common problems promise to produce an even more comprehensive and penetrating dynamic psychology in the future.

The methods of dynamic psychology, closely related to clinical procedure, include projective techniques; depth interviews; analysis of personal documents; personality inventories; studies of the socialization of the child by his parents, siblings, and peers; interpretations of psychiatric experience; and the study of basic attitudes in the emotional

organization of the individual. The data produced by these methods are difficult to treat statistically and to integrate with quantified data produced by other approaches. Because they are expensive and time-consuming, these techniques can be administered only to a limited number of individuals. Further, no one of them gives an adequate assessment of personality. For the purposes of national behavior research, they should be used in conjunction with other methods of social psychology and of the behavioral sciences generally. They have been used in this way in studies of reactions to contents of mass media. They can also be employed to probe the personalities that have been designated by sociological and communications techniques as influential in a society. These dynamic methods can be used, too, to study intensively the individuals isolated from large samples by survey techniques such as opinion and attitude questionnaires. Relatively superficial attributes of behavior discovered by survey methods can thus be traced to their psychological roots and thus it can often be shown that apparently similar attitudes serve different functions in different personalities. The Studies in Prejudice sponsored by the American Jewish Committee are examples of this kind of integration of survey and dynamic techniques to explore the interrelations of attitudes within the individual and their sources in his personality structure.

Analysis of mass media is a fruitful approach to behavior in society. One of the difficulties in the past has been the emphasis that communications research has placed on statistical treatment of media contents. Social psychology can contribute to the analysis of mass media its understanding of personality and personality development and can use content analysis as a point of departure for studying personality. Meanings of media contents to members of the audience hypothesized from the contents alone are often unsupported when put to test by empirical studies of personalities of the members themselves. The same contents may have widely different functions for the personalities of different individuals. All available bodies of theory, method, and knowledge relevant to personality should therefore be brought to bear on the meaning of media contents to the individual member of the audience. The social psychologist should also study how the individual's social experience in other spheres is related to his reactions to media.

Thus, social psychology's major contributions to the study of nationality characteristics should be its methods of empirical analysis of individual personality and personality development through social experience and the evolution of a cumulative body of knowledge about these phenomena. Its most useful contributions will come through development of more universal and penetrating theory and methods, and this development will be best encouraged through cooperation with other disciplines.



## A STUDY OF PSYCHOLOGICAL FINDINGS ON ONE HUNDRED CHILDREN RECOVERING FROM PURULENT MENINGITIS

by IYA MAYNE JOHNSON\*

With continuing improvements in the treatment of children who develop bacterial meningitis, and with the increasing expectation that the majority of them will survive, it is now possible to observe and to evaluate these children after their medical recovery following meningitis. This study represents an attempt to learn more about the effects of purulent meningitis on the mental development of children after their recovery from this disease, either with or without complications. With the assistance of the Medical Staff and Research Foundation of Children's Hospital, Washington, D. C., all children from less than one year to twelve years were examined to determine whether or not changes occurred in the mental status.

One hundred and ten patients with final diagnosis of purulent meningitis were admitted during the period of study from December 1951 to November 1955. Ten of the patients expired within a few days of hospital admission. These patients are not included in the study since it was possible to obtain on them only the psychological status indicating pre-illness status. The main body of this study is concerned with the 100 patients who survived purulent meningitis.

The plan is essentially the study of the relationship of pre-illness mental or psychological status with post-illness mental or psychological status. Pre-illness status was determined by a technique of evaluation from data collected by interview with parent or guardian at the beginning of hospitalization. Post-illness status was determined one month after illness and again three months after illness. These determinations were from actual tests of the subject.

The one-month test was chosen because it was thought to obtain information on mental status as soon as feasible following recovery from the acute symptoms of illness.

Complications often develop during the acute phase of illness, and in some instances they either diminish or disappear following recovery. It was felt that a three-month follow-up would be a reasonable period of time to allow for improvement in the complications and to obtain an evaluation of mental status at this time.

The three mental or psychological status determinations constituted the primary variables of this study.

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Certain factors which it was thought might be related to findings with reference to the three primary variables were studied. Age was given major consideration. Other factors, such as, sex differences, race differences, duration of illness prior to hospital admission, chemotherapy before hospitalization, infecting organism, effect of subdural effusion, and other complications, were studied where the number of cases available from the 100 children evaluated was sufficient.

The Vineland Social Maturity Scale was used as the measuring instrument with which to obtain the pre-illness psychological and mental status. This device yields a social quotient (S.Q.) rating which is derived from behavioristic facts obtained from interview with an individual familiar with the child's development and performances.

The Cattell Infant Intelligence Scale was used as the instrument to evaluate the after illness mental status on children less than two years of age, first at one month, then at three months. The Stanford Binet Scales of Intelligence were used to evaluate all children above the two-year level after their recovery at one month and again at three months. Both of these instruments provide an intelligence quotient (I.Q.) rating.

Results for the three measures used in this study were as follows: Four of the one hundred children could not be evaluated with the selected measuring devices. These four children were, therefore, considered as a separate subgroup. Three patients in this subgroup developed severe mental and physical retardation due to the disease. The retardation of the fourth child was attributed to congenital retardation present before illness, rather than to the disease process.

#### CHANGES IN MENTAL OR PSYCHOLOGICAL STATUS AFTER ILLNESS

The findings for the group as a whole indicate that there was no significant difference between pre-illness status as measured by the Vineland Social Maturity Scale and post-illness status three months after illness as measured by the Cattell and Stanford Binet Intelligence Scales. The favorable findings of this study in respect to recovery from meningitis may well relate to the effectiveness of recent methods of treatment. There is also to be considered the fact that previously reported studies indicating unfavorable results have often been limited to the consideration of only the obviously damaged cases. The statistical findings on comparison of pre-illness measurements with evaluations one month after illness, and on comparison of evaluations one month after illness with evaluations three months after illness, indicate that the story is one of temporary depression of psychological functioning (as measured by the one month tests) with recovery which appears to be back to a level not significantly different from the pre-illness level by three months.

It cannot be stated for certain why there is the one month after illness depression but there would seem to be several factors which might enter in. Medically there may still be some effects of toxicity of the disease and some effects from depression of general health factors. Psychologically there may be adverse effects present at the one month testing from the confinement of the hospital environment. Also, psychological recovery may involve a period of learning and readapting which cannot take place in the short span involved in the one month testing.

#### RELATIONSHIP OF OTHER FACTORS TO CHANGES

*Infecting Organism.*—The most frequent causal organisms were those of *Hemophilus influenzae* and *meningococci*. These affected two-thirds of the total number of children in this study. For the other one third of the patients the causal organisms were indicated as *Diplococcus pneumoniae*, *streptococci*, *Escherichia coli*, or type "Undetermined". Mental and psychological status changes after illness to causal organism does not reveal any significant differences between infecting organisms.

*Cell Count.*—An inspection of the number of cells in relation to changes in mental status indicated no basis for a conclusion that the most purulent cerebrospinal fluids tend to produce the highest incidence of mental sequelae. Some individuals recovered without decrement, while others showed a decrease in mental level following recovery, regardless of whether the cell counts were high, or low, or somewhere in the middle. Some of the undesirable after-effects may be due in part to toxicity from the illness, or due to specific drug sensitivity.

When tests of significance were computed, the factor of cell count in cerebrospinal fluid was statistically not significant in showing a difference in post-illness mental status.

*Sex.*—Sex does not appear to be an important factor, on the whole, in relation to psychological sequelae of meningitis. One finding significant at the .05 level appears. Comparing pre-illness status with mental status at one month following recovery, the male patients show a significant decrease at the .05 level. This difference between the sexes does not carry through to the three-month level.

*Race.*—Race does not appear to be an important factor, on the whole, in relation to psychological sequelae of meningitis. One finding significant at the .05 level appears. When classified by race, the white patients showed a decrease in mental status at one month following recovery. This decrease in performance is significant at the .05 level. Negro patients showed no significant difference. This difference between the white and negro patients does not carry through to the third month following recovery status.

*Duration of Illness Prior to Hospital Admission.*—Inspection of data indicated that most children were ill one to two days prior to hospitalization. Upon examination, this factor was not significant and could not be shown to have a significant effect upon change in mental status after illness.

*Chemotherapy Before Hospitalization.*—When the findings were examined for those patients who received treatment before hospitalization and compared with those who did not receive treatment until hospitalization, it was found that chemotherapy before hospitalization did not have a marked effect upon the decrease or change between the pre-illness mental status and post-illness status at one month following recovery.

*Sequelae.*—Sequelae, such as, deafness, ear complications, motor incoordination, muscular weakness, ataxia, swelling of joints, etc., appeared in the different age groups. Because of individual reactions to purulent meningitis, some children showed a decrease, or an increase, or no change in psychological and mental status, depending on the complication.

The greatest number of complications appeared in the youngest age groups. Not only were there significant changes in the direction of a decrement in performance between pre-illness status and post-illness status at one month after recovery, but in the less than one-year group of thirty-two children, a total of twenty children received subdural taps. Even though twenty children received taps, in eleven cases the suspected subdural effusion apparently never progressed. In other words, nine children were determined to be developing subdural effusions. Seven of this group of nine underwent neurosurgery (Craniotomy) to remove newly formed or forming membranes. When these nine children were observed further, seven showed a decrease in I.Q. as compared with S.Q. of five points or more at the one month testing and five showed such a decrease at the three month testing. In this age group only nine out of twenty-three at the one month testing, and six out of twenty-three at the three month testing, showed such a decrease. These figures are suggestive of adverse effects of subdural effusions but are not conclusive because of the small number of cases.

Four of the children in the less than two-year group presented an overall picture of both physical and severe mental retardation. Three children showed such tremendous decreases between pre-illness and post-illness mental levels that they were not included in the over-all statistical analyses of the primary variables. Another child, less than one year, also was not included in the general findings because of congenital mental retardation and hydrocephalus. With the exception of the congenitally retarded child, three of the children developed such degrees of brain damage that institutionalization was recommended. However, before institu-



tionalization could be arranged, one of the children expired nine months later after developing severe hydrocephalus following meningitis.

In conclusion, it may be indicated that change or no change in mental status after recovery from purulent meningitis may be attributed in part to the nature of the disease process, in part to the response of the individual physiological systems—aided by chemotherapy, and in part to the attitudes and understanding displayed by the parents toward their recovered children, as well as the behavioral inclinations shown by the recovered population. If, after the children return home from the hospital setting the environment is not too restrictive but, instead, affords opportunities for a variety of differential experiences, it is believed that with a reasonable passage of time, the majority of children will not be psychologically or mentally handicapped as a result of purulent meningitis. To support this conclusion, it would be desirable to follow and observe those children without serious sequelae over an interval of time. However, this study has shown that such a trend exists, indicating that the average post illness mental level at three months was not significantly different from the average pre illness mental level.



## NON-SELF-EXECUTING TREATIES AND CONGRESSIONAL ACTION IN THE UNITED STATES

by JOHN WILLIS KIZLER \*

The dynamism of the contemporary Society of Nations, the scope of activity of international relations, and the increased participation of the United States in the affairs of the world have tended to create for the United States a position of greater stature in the international community than previously realized. A manifestation of this growth within the Community of States by the United States, has been the increased use of treaties in the conduct of American foreign relations. The subject matter of treaties is no longer concerned solely with those conditions that have traditionally been considered within the sphere of generally recognized international affairs—peace, war, or commerce. For now, subjects formerly deemed to be exclusively domestic in character, and some matters not even within the comprehension of the human mind are, by necessity, brought into the legitimate sphere of international relations—nuclear physics, cosmic penetrations, or socio-economic cycles. The advance and acceleration of technological and communicative techniques have forced upon the Society of Nations, and the United States in particular, a realization of the existence and necessity of a condition of national interdependence.

The conditions inherent in such an international political system have contributed to the viability of the treaty as an instrument of contract to bind the States of the world in their mutually agreed principles or accepted objectives. The treaty has assumed an importance as a part of the domestic order, while heretofore, the treaty had often been a rather remote instrument of international contract. This increased use and, indeed, necessity of the treaty has concomitantly created an awareness on the part of statesmen, political leaders, and laymen of their intimate connection with the treaty process.

Treaties are the means by which States undertake obligations toward each other and other international persons in their capacity as subjects of international law. In other words, they are the manifested accord or the will between or among two or more States. Because treaties may be considered contracts involving sovereign States, publicists in international law have consistently expressed the opinion that treaties must be accorded the highest legal and moral authority. The treaty is an instrument of solemn obligation and maintains a durability within the international

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**legal system.** Since treaties have always been treated with this respect, the terms of these instruments are solemn obligations which the contracting States have promised to fulfill within their capacity as States. Consequently, States are then bound by international law, national faith, and their sovereign honor to conform to the requirements of the particular instrument when negotiated and ratified. The procedure for approval and definition of the legal status of the treaty within the individual sovereign States, however, is entirely a matter of each State's Constitutional requirement.

In the formulation of the Federal Constitution, the Delegates assembled at the Constitutional Convention in 1787 carefully considered the treaty procedure and legal status of treaties, based upon their knowledge of public law and the experiences observed during the existence of the Articles of Confederation. Cognizant of the inadequacy of the provisions for the conduct of treaty relations under the Articles of Confederation, the Convention declared that treaties should be the supreme law of the land after having been negotiated by the President with the advice and consent of the Senate. Though some Delegates objected to the centralization of the treaty process in this manner, the Convention rejected the proposition that treaties, having been declared to be the supreme law of the land, should require Congressional approbation in order to be effective within the domestic legal system. And thereby the Convention effectively excluded the House of Representatives from the **treaty process under the formal terms of the Constitution.** The Constitution has provided specifically for treaties within Article II and Article VI, the former describing the treaty power and procedure and the latter defining the position of treaties within the domestic legal structure; however, the Constitution does not provide limitations on treaty subjects nor does it provide a procedure for treaty implementation for those treaties that may require legislation.

The practical effectiveness of treaties within the United States remains dependent upon the decisions or will of the three departments of the Federal Government either acting conjointly or individually. Though treaties concluded by the United States are by Constitutional mandate the supreme law of the land, they have generally been further defined as either self-executing or non-self-executing. In the leading case on this question, *Foster v. Neilson*, Justice Marshall observed:

when the terms of the stipulation import a contract, when either of the parties engages to perform a particular act, the treaty addresses itself to the political, not the judicial department and the legislature must execute the contract before it can become a rule for the court.

The lack of a provision within the Constitution of the United States for the implementation of treaties has frequently presented the anomaly of

treaties being effective as a national compact under international law, on its being proclaimed, but not being operative as to the particular engagements until all the requisite legislation has been passed.

The issue is then presented as the relationship between the status of treaties in international law, the Constitutional context, and Congressional powers and prerogatives. This type of treaty generally involves such subjects as appropriations, alteration of revenue or commercial regulations, the incorporation and administration of territory, the organization of courts and creation of offices, a declaration of war, and the definition of crimes or the extension of criminal jurisdiction. Some commentators on this question, such as Cyrus King, have suggested that:

... whenever a treaty or convention does, by any of its provisions, encroach upon any of the enumerated powers vested by the Constitution in the Congress of the United States, or any of the laws by them enacted in execution of those powers, such treaty or convention, after being ratified, must be laid before Congress, and such provisions cannot be carried into effect without an act of Congress.

The basic authority for Congressional participation in the treaty-making process is derived from the provisions of Article I, Section 7, clause 1 of the Constitution, which provides:

All bills for raising revenue shall originate in the House of Representatives, but the Senate may propose or concur with amendments as on other bills.

Article I, Section 8, clauses 1 through 17 and clause 18 which provides that Congress has the power:

To make all laws which shall be necessary and proper for carrying into execution the foregoing powers, and all other powers vested by this Constitution in the Government of the United States, or in any department or officer thereof.

and Article I, Section 9, clause 7 which provides:

No money shall be drawn from the Treasury but in consequence of appropriations made by law.

The legislative powers of Congress contained in these provisions of Article I of the Constitution are sufficient to enable Congress to enact implementing legislation for all treaties that do not violate the Constitution. Thus, if the treaty is properly within the domain of the treaty power, it would appear that Congress has ample power to execute the treaty terms by enacting the necessary legislation.

Certain treaty subjects require legislative implementation in order to



become practically effective within the United States. One of the most frequent instances in which treaty terms require Congressional implementation is that of appropriations. The practice of providing for money through treaty terms has been accepted as a legitimate function of the treaty power. Because of the development of this treaty practice, the Congress has accepted its role in the appropriation of funds required by treaties. Although the appropriation power is an exclusive power of the Congress and one of which the Congress is particularly cognizant, the Congress has never failed to provide the funds necessary to satisfy obligations incurred through the treaty power. However, Congress has never disclaimed its position in the appropriation power, and, as the importance of foreign economic assistance has increased as a method of American foreign policy, the position of the House of Representatives has been enhanced.

Closely associated with the subject of appropriations and, perhaps, more clearly defined than some of the other issues of treaty implementation is the treatment of tariff and revenue conventions. It has been suggested that the House of Representatives was given the exclusive position in originating revenue bills as a compromise to the Senate power in the treaty making process. In most instances, the House has consistently defended its prerogative in this matter and has exerted its influence either actively or passively in the negotiation of treaties affecting tariff and revenue measures. Most authorities in public law have acknowledged the pre-eminent role of the House in this respect. Hyde suggested that conventions of the United States involving the modification of existing revenue laws, "have been deemed to be subject to the condition, which it has long been the practice to incorporate in the agreement, that the change should be dependent upon the consent of the Congress." The contemporary use of "anticipatory legislation" such as the Reciprocal Trade Agreements Act in the conduct of American foreign policy has, to a certain extent, eliminated Congressional review of specific bilateral tariff adjustments. However, it would appear that this practice has reflected only a change in method and not a basic alteration of the Congressional position. The House of Representatives has consistently defended its position in this respect against either Senate or Executive encroachments, and it has continued to maintain that a treaty altering the existing revenue laws does not become effective to bring about this change until the approval of the House has been obtained.

Under the powers granted to Congress under Article I of the Constitution, it may also legislate upon those treaty terms involving subjects not enumerated by the Constitution. Through this power, the Congress has accorded judicial powers to foreign consuls in the United States, conferred judicial powers upon American consuls abroad, provided for the extradition of fugitives from justice, and provided criminal penalties

called for by the terms of the treaty. The requirements of the terms of many of the recently concluded administrative or regulatory treaties have necessitated the enactment of criminal penalties by the Congress.

Another type of subject which has always been presented to the Congress for its concurrence in the execution of treaties has been the cession or acquisition of territory. Congressional authority with respect to these acts is exercised through its power over the public domain, the appropriation of funds for the purchase of territory, or legislative provisions for the assimilation and determination of the status of the territory and inhabitants. This power of Congress is derived from Article IV, Section 3 which provides:

The Congress shall have power to dispose of and make all needful rules and regulations respecting the territory or other property belonging to the United States . . .

Based upon this provision, the Congress has exercised its control over the acquisition of territory through the control over the purse strings and has supervised the cession of territory through the basic Constitutional provision cited. Although the situations in which the Congress is able to exert its power in effecting treaties of territorial cession or acquisition are rather limited, the Congress has, on occasion, asserted its role in this respect quite effectively.

There has been little argument on the part of Congress or publicists on the ability of the Congress to enact legislation to implement the terms of non-self-executing treaties once those treaties have been defined. Only in certain instances when the treaty subject is one involving delicate political considerations does the Congress appear reluctant to assume the power to enact the required legislation. Having described the terms of non-self-executing treaties and the relation of Congress to those terms through the exercise of the legislative powers in implementing the treaties concerned with certain specific subjects, the remaining issue involves the obligation resting upon Congress to enact the legislation necessary to the practical implementation of the treaty. The status of treaty performance in the United States is somewhat indistinct because of the absence of an exact definition of the role of Congress, and the House of Representatives, in particular, in executing treaty terms. This position has not been defined by Constitutional provision, Court decision, or practical agreement by the Congress itself.

Although most authorities have suggested that the Congress is bound by a moral, legal, or some type of obligation to enact legislation, some authorities on public law and members of Congress have suggested that the legislative branch is not bound by any obligation to implement a treaty, although that instrument may have been properly ratified by the Executive. It has been suggested by Story that Congress is not bound to

respect the terms of a treaty, and that it is "at free liberty to make or withhold [legislation] without being chargeable with violating the treaty or breaking the faith of the nation." Levitt adequately represented the position of those who deny the existence of an obligation upon Congress by stating that:

The Constitution contains no express mandate upon the House which compels it to furnish revenue for foreign affairs. Nor is there any duty, express or implied, legal or moral, upon the House to implement in any way any of the commitments which may be made by the President, or the Senate, or the State Department, to any foreign nation.

In consideration of this position it would seem that the consensus of Congress has been that it must act in considering legislation to implement a non-self-executing treaty in a three fold capacity: to protect the national interest, to defend Congressional institutional prerogatives, and, in some instances, to restrain the Executive in the conduct of foreign relations.

Strongly opposing the view that Congress is not bound by any obligation to enact implementing legislation, is the view held, principally by Executive officers and publicists in the international law field, that Congress is definitely bound by a moral or legal obligation in this respect. Hamilton contended during the debate over the implementation of the Jay Treaty in 1796 that:

the House of Representatives have no moral power to refuse the execution of a treaty which is not contrary to the Constitution, because it pledges the public faith . . .

Kent observed that if the Constitutional provision contained in Article VI is to be assumed to be valid, then treaties, being the supreme law of the land and enforceable upon the Nation, must be so respected by all branches of the government, including the House of Representatives. The House may not be assumed to be above the law. According to this view, while the President and the Senate are primarily responsible for the treaty power, the House remains bound to redeem the pledged national faith by enacting the laws necessary to carry the treaty stipulations into effect. In this opinion, the action of the Congress may be essential to the execution of the treaty, though not necessary for the validity of the treaty.

Whether or not the obligation which may exist upon Congress is recognized, some Members of Congress and certain authorities in public law have contended that the act of deliberation and discretion is inherent to the legislative process. This act of legislative discretion has been deemed by certain authorities to extend not only to the contents of the legislation under consideration, as has been contended by some, but also to



the subject matter of the treaty, the propriety of the treaty in terms of the domestic jurisdiction, or the necessity of the legislation or appropriation required. The more restricted point of view has contended that discretion may extend only to the question of the form or content of the implementing legislation within the context of the treaty requirements; while the more extreme view has held that the House is under an obligation to review the policies underlying the treaty or the constitutionality of the treaty itself. The Supreme Court in *Whitney v. Robertson* sustained this point of view toward discretion, when it was observed that legislation implementing treaty terms "is as much subject to modification and repeal by Congress as legislation upon any other subject."

It would appear that the Congress has exercised its discretionary or deliberative capacity in order to air its views on the conduct of foreign policy, the state of Congressional opinion on international relations, or even, on occasion, to direct the emphasis of American foreign policy through its power of appropriation. Since there has been no Constitutional provision defining the extent of the obligation upon the Congress to enact legislation to implement treaties, nor Court decisions interpreting exact procedures in executing treaties, nor a consensus in Congress on its role in treaty implementation, the whole question has been subject to the vagaries of political expediency or inconsistent legislative precedent.

The present indefinite character of treaty implementation within the United States has, it appears, unnecessarily created conflict and controversy between the various departments of the Federal Government. It would seem that the Congress has adequate power, through the legislative process, to protect both its own institutional interests and the higher considerations of national security against treaty provisions it may deem to be unwarranted. The Congress has suffered in its relations toward the non-self-executing treaty from its own indecision regarding its powers and the expression of those powers in the implementation of treaty terms. The House of Representatives has vacillated in its attitude toward treaty implementation from a position of defiance to one of submission. The Senate now possesses power to require that all treaties be accorded legislative implementation, through the exercise of its power of reservation when the particular treaty is under its advisement.

It would seem that the uncoordinated efforts of the Legislature to effect a definite position toward the issue of treaty implementation, failure to recognize its inherent powers or legislative competence, and its reluctance to seek a formalization of these powers and capacity has failed to bring to fruition its essential role in the implementation of non-self-executing treaties.

## EFFECTS OF CHEMICAL AGENTS ON FOUR ESTABLISHED HUMAN CELL STRAINS IN TISSUE CULTURE

by IRA KLINE\*

The responses of four established human cell strains to acetylpodophyllotoxin- $\omega$ -pyridinium chloride (N.C.I. #3022), colchicine, hydrocortisone, and polysaccharide from *Serratia marcescens* were studied *in vitro*.

From the limited number of cell lines derived from cancers, Strain HeLa and Strain KB were selected. The third cell strain, Intestine 407, was isolated from normal tissue. The fourth line, Strain D-189, was derived as a histological malignant transformation *in vitro* from a normal appearing, human connective tissue. These four strains, which were readily available for these studies, grow well in culture on bare glass. Familiarity with the appearance of untreated cultures of these cell strains had been gained from previous experiments. These cell strains were selected to see whether the "cancer" lines would respond differently from the "normal" lines.

N.C.I. #3022, a water-soluble derivative of podophyllotoxin, has stimulated much interest at the National Cancer Institute. A classical mitotic poison, colchicine, was chosen for comparison with N.C.I. #3022. Both of these chemicals have produced similar effects on a variety of plant and animal tissues. Hydrocortisone and polysaccharide from *Serratia marcescens* are also chemical agents of much interest in the field of cancer chemotherapy. Many conflicting reports have appeared concerning their activity both *in vivo* and *in vitro*. These chemical agents were selected for these studies in the hope of shedding more light on the nature of their activity at the cellular level.

N.C.I. #3022 applied to all four cell strains at concentrations of 10 to 0.1 gamma/ml for six hours produced cytological changes consisting of metaphase arrests, fragmented chromatin, and bizarre cytoplasmic processes. No effects were observed in any of the cell lines when they were exposed to the drug at a concentration of 0.01 gamma/ml.

In cultures of all four cell strains, which were exposed to N.C.I. #3022 at a concentration of 1 gamma/ml for six hours, it was observed that the drug effect had practically disappeared eighteen hours after the drug was removed.

Colchicine at concentrations of 10 to 0.1 gamma/ml produced similar

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cytological changes in all four cell strains after six hours of exposure. No effects were observed in D-189 and Intestine 407 cells after a six-hour exposure to colchicine at a concentration of 0.01 gamma ml, but some metaphase arrests were observed in HeLa and KB cells at this concentration.

Cultures of all four cell strains were exposed to colchicine at a concentration of 1 gamma ml for six hours. Four days after the removal of the drug from the cultures, indications of the disappearance of the drug effect were seen in the HeLa, KB, and Intestinal cells. However, the degree of damage appeared to be more pronounced and more persistent in cultures of D-189, as judged by the appearance of the cultures throughout a fourteen day period after the removal of the drug.

Hydrocortisone, applied to D-189 cells at a concentration of 10 gamma ml produced definite cytotoxicity consisting of extensive cytoplasmic vacuolization in three or four days. When the drug was discontinued, upon the observation of this cytological change, marked residual damage was seen at the end of a seven day recovery period.

In contrast, the cells of epithelial origin (HeLa, KB, and Intestine 407) required one to two weeks of exposure to 10 gamma ml of hydrocortisone before cytological changes were seen. The most resistant of these was Henle's Intestine. The changes observed in epithelial cells were a striking enlargement involving cytoplasm, nucleus, and nucleolus, resulting in bizarre giant cell forms. In each instance the drug was discontinued when a definite effect was first seen. The degree of residual damage found at the end of the recovery period of one week for each line derived from epithelium was slight, in sharp contrast to the extensive residual damage in the D-189 cells.

Polysaccharide from *Serratia marcescens* applied at a concentration of 100 gamma ml to Intestine 407 cells produced cytological changes after six to eight days exposure. These changes consisted of the disruption of the epithelial pattern of these cells, the appearance of spindle-shaped forms, and presence of bizarre cytoplasmic processes. The Intestine cells resumed their normal epithelial characteristics seven days after the drug was discontinued.

No cytological effects were seen in HeLa or KB cells after fourteen daily applications of polysaccharide at a concentration of 100 gamma ml, but cytological changes were sometimes seen in D-189 cells after four to seven days of exposure to polysaccharide at this concentration. The cytoplasmic changes consisted of irregularly beaded processes, amoeboid protrusions, and cytoplasmic vacuolization. Differences between control and treated D-189 cells were not always producible with this drug as applied.

The observations made in a system where human cells are exposed to chemical agents *in vitro* can contribute much to our knowledge of the



mechanism of action of these agents. Chemical agents that have shown some activity on animal tumors *in vivo* can then be tried on various types of cells in tissue culture. Many of the complex physiological systems such as those involved in host blood supply, nervous system, and detoxification mechanisms are absent in these *in vitro* experiments. The cytological changes observed in experiments such as the current ones can most probably be attributed to the interaction between the cells and chemicals under study.

The drugs or their derivatives that were studied in this dissertation have been employed in human cancer patients. The results from these trials have not been too encouraging.

They ranged from no noticeable effect to temporary relief of symptoms. In the case of colchicine, the temporary regressions were followed by an accelerated growth rate. The effects of these agents on the growth of transplanted tumors in mice were greater than in humans. It is difficult to compare results observed *in vivo* with those seen *in vitro*. An interesting point is, however, that cytological changes were observed in these current tissue culture experiments when N.C.I. #3022, colchicine, and hydrocortisone were used at concentrations equal to or below those used on tumor bearing mice or in cancer patients. Studies of the effect on tissue cultures of these compounds at the same concentrations as those used *in vivo* served to intimate what was happening at the cellular level. Higher concentrations of polysaccharide from *Serratia marcescens* were necessary to produce cytological effects in tissue culture than those used in animal or in human studies. It has been the belief of some workers that the effects seen when tumor-bearing mice were treated with polysaccharide were produced indirectly by a disturbance of the peripheral blood circulation.

Tissue culture experiments offer a sound scientific method for the study of the effects of chemical agents on human cells prior to their trial on patients. The knowledge gained from such experiments as these could facilitate decisions related to future clinical tests of the chemical agents.

## SOME RELATIONS BETWEEN INPUT AND OUTPUT POWER SPECTRA IN CERTAIN NONLINEAR SYSTEMS

by HARTLEY LINWOOD POND\*

A nonlinear differential system with a random forcing function is considered. The analysis provides a relation between the input and output power spectral density functions. For a physical system the power spectral density function indicates the distribution with respect to frequency of the energy of the system.

Although the study of nonlinear differential systems with random inputs is of interest in itself, there are a number of important physical problems whose mathematical model would be such a system. Examples of such physical problems are listed in the introductory chapter.

It is natural that a problem with important engineering applications should attract the interest of a number of scientists. However, much of the significant work originated only in the last ten or fifteen years, that is either during or just after World War II. One of the foremost papers was published by S. O. Rice in 1944.

In the present work (Chapters II and III) the random function is given by a power series with random functions as coefficients. The properties of the random coefficients are so defined that the series specifies what is called a second-order stationary process. For such a process the expected value and autocorrelation function are either independent of time or dependent only on time differences.

The nonlinear problems considered by Rice are related to particular elements of more general systems. For example, the output of a given element may be the square of the input. Additional work along these lines has been done by N. Wiener, M. Kac, W. E. Thomson, and has been discussed in a recent textbook by J. H. Laning and R. H. Battin. It does not appear that the interaction between the linear and nonlinear elements of a system has been considered by these authors. In the present report the system is considered as a whole and the linear and nonlinear parts are allowed to interact.

The random input functions considered are further restricted in Chapter IV by specifying that the random coefficients, used in defining the input function, have a normal distribution. The characteristic function of this distribution is defined and then used to obtain the expected value of various nonlinear functions of the input process.

In Chapter V a nonlinear differential system with random input func-

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tion is considered. The differential equation of the system is of the second order and the nonlinearity is taken as a weak restoring force that is proportional to the square of the amplitude of oscillation. An approximate solution to the system is obtained by making use of the properties of the second-order stationary processes discussed in Chapters II-IV. The final result is given as a relation between the input and output power spectral density functions.



## VIRULENCE STUDIES OF *ENTAMOEBA HISTOLYTICA* WITH THE GUINEA PIG AS THE EXPERIMENTAL HOST

by DOROTHY JANE TAYLOR\*

Amebiasis, the disease caused by the protozoan parasite *Entamoeba histolytica*, is reviewed briefly from the standpoint of prevalence, mode of transmission, control, prevention, and treatment. Particular emphasis is placed on the wide variation in the symptomatology of the disease. The factor or factors responsible for the ability of the parasite to cause disease in some individuals and to survive in others without apparent manifestations of damage to the host are unknown.

Some of the more important problems yet to be solved in the field of amebiasis are discussed. Among these are the cultivation of the parasite in a synthetic medium free of living cells, variation in virulence exhibited by ameba strains and races, the role of the host in the relative intensity of the infection, and the continuing need for a highly effective amebicide. Problems encountered in the process of establishing an experimental chemotherapy testing program for amebiasis brought out the necessity for further investigations into the host-parasite relation in order to produce a consistent infection in the experimental host. The studies are summarized below.

Three strains of amebae were used for the present experiments; two were known to be strains virulent for both man and lower animals, and the third was a so-called avirulent strain for man. The history of each strain is given. Young guinea pigs were used as the experimental host primarily because of their size and the fulminating type of amebic infection that can be induced in them. A semi-synthetic guinea pig diet (referred to as the R.E. diet) was used in the majority of the experiments; however, a special diet was fed in some of the early studies.

One of the above mentioned strains of amebae was used continuously for six and a half years for the intracutaneous inoculations of the guinea pigs. The infectivity of this strain (based on the percentage of induced infections) decreased significantly during the first four years, but in the fifth year an unexplained increase in infectivity occurred. By means of a year an unexplained increase in infectivity occurred. By means of a grading system, no significant change was recorded in the pathogenicity of this strain. However, if the mean day of death of the infected animals is selected as a criterion of pathogenicity, then a decrease did occur: the mean day of death was later in the last four years than in the first

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two and a half years. Analysis of these data showed little variation in ameba virulence on a monthly or seasonal basis.

The above mentioned strain was passed through a guinea pig and increased infectivity was noted from the serial animal transfer. The diet was changed from a ration containing natural products (the special diet referred to above) to the semi-synthetic R-E ration without significantly affecting the amebic infection.

Earlier studies with rats had shown a relation between amebic infection and carbohydrates in the diet. In the present experiments a carbohydrate diet consisting of sucrose, fructose, or lactose led to the production of a high percentage of severe amebic infections. However, with corn starch a significantly lower percentage of infections was induced. The severity or frequency of infection could not be attributed to dietary deficiencies. A probable explanation of the action of carbohydrate may lie in its effect on the bacterial flora of the intestinal tract.

Other dietary studies included the use of still another semi synthetic ration (referred to as the R B diet) and the effect of a folic acid deficiency. In guinea pigs fed the R B ration, a low percentage of infections was produced but the infections were of a severe nature. This ration contained a small quantity of corn starch and a higher proportion of most of the vitamins than were found in the R E diet. On the basis of growth of uninoculated guinea pigs fed on each of the two diets, the second ration did not support better growth than the first diet. Folic acid deficiency studies were given in detail but it is probable that only a mild folic acid deficiency was produced.

Although the special guinea pig diet of natural products formulated in this laboratory resulted in a consistent percentage of amebic infections being produced in this host, it soon became obvious that the routine ameba culture was not as virulent as it had been originally. This observation prompted experiments on rapid animal transfers of the routine culture in an attempt to enhance virulence and particularly infectivity. From these experiments it was concluded that rapid animal transfer of cecal contents is a successful method of enhancing virulence of ameba cultures. However, this procedure does not assure continued infectivity at a high level. From the serial transfer studies no conclusion was reached as to the reason for the increased virulence of these cultures.

A further series of tests was carried out with another virulent strain of amebae. This strain was grown monoxenically with 13 different bacterial associates, without bacteria in a chick-embryo minee, and finally with the multiple bacterial flora of the routine ameba strain. Of the 13 monoxenic cultures only that of amebae grown with *Bacterium coli* (Fulton) approached the infectivity and pathogenicity of the same strain of amebae grown with the multiple bacterial flora. Amebae from the axenic culture were unable to produce severe infections and their growth

*in vitro* was also poor. No significant correlation was found between the number of parasites inoculated and virulence, but the numbers of amebae used were over a relatively narrow range. Suspensions of each of the bacteria used in the monoxenic cultures, when tested alone in guinea pigs, did not cause any infections or deaths. It could not be concluded that any single bacterium markedly influenced the virulence of the amebae; however, an amebae-*B. coli* culture appeared to enhance virulence as did a multiple flora culture.

Efforts were also directed toward enhancing the virulence of the routine culture by other means. Cultures were treated with either penicillin, streptomycin, or the combination of penicillin and streptomycin for one or two 48 hour transfers. Following these short periods of exposure to antibiotics, no significant lasting effect on the virulence of the amebae was found. However, there was evidence of a temporary effect on virulence.

A series of experiments was carried out in which the culture was not treated but the guinea pigs were given two or four doses of one of the following antibiotics or sulfa drugs at varying dose levels prior to parasite inoculations: penicillin, streptomycin, terramycin, aureomycin, sulfadiazine, sulfaguanidine, or succinylsulfathiazole. From these experiments it was concluded that the bacterial flora of the host's intestinal tract was not affected in a manner which would aid invasion by the amebae.

Two experiments are reported on the immediate effect upon virulence of induced encystment of the routine ameba strain. Following encystment, it was observed that the new cultures were no more virulent than the routine strain which rarely encysts spontaneously.

Additional studies concerned the effect on infectivity and pathogenicity in the intestinal tract of the guinea pig of routine strains of *E. histolytica* passed through the liver of the same species of animal. While no lesions could be detected in the liver of the guinea pigs, ameba could be cultured from this organ. Following *in vitro* cultivation for 14 days of *E. histolytica* with a bacterium designated as organism 7, a significantly higher percentage of intestinal infections was produced than obtained with the original culture. However, additional trials failed to indicate that the increased virulence was of a permanent nature. Additional experiments were tried with other cultures. It is concluded that liver passage of *E. histolytica* results in no permanent change in virulence.

It is apparent from the data presented here that factors inherent in *E. histolytica* per se are responsible for its disease producing capacity but that environmental factors, both in culture media and in the definitive host, play a significant role through mechanisms presently unknown.



## INHIBITION OF ADRENAL CORTICOSTEROID SECRETION IN THE INTACT AND THE HYPOPHYSECTOMIZED DOG

by WILLIAM WIRSING TULLNER\*

The inhibition of endocrine secretions by pharmacologic agents which act specifically on the functional capacity of a particular endocrine tissue offers a useful means of investigating the physiology of that tissue. In the case of an endocrine tissue such as the adrenal cortex, these agents provide a possible means for chemotherapeutic control of hyperadrenocorticism due to such clinical conditions as adrenal cortical carcinoma and adrenal hyperplasia.

Depression of adrenal cortical secretion has been reported for few pharmacologic agents. Chemically induced atrophy of the dog adrenal cortex was reported by Nelson and Woodward (25). These investigators found that chronic oral administration of the insecticide DDD or 2,2-bis (p-chlorophenyl)-1,1-dichloroethane exerted an adrenocortical effect. In the dog adrenal gland, the zona fasciculata and zona reticularis can be destroyed by DDD treatment. Adrenal vein blood content of 17-hydroxycorticosteroids following chronic DDD treatment is extremely low even in animals subjected to severe operative trauma and stimulated with a large intravenous dose of ACTH (26).

Amphenone, or 1,2-bis(p-aminophenyl) 2-methyl propanone-1 dihydride, was synthesized by Allen and Corwin (27) as one of a series of compounds prepared for testing in the laboratories of R. Hertz. These synthetic diphenyl compounds were initially screened biologically for possible antagonism to the estrogenic action of diethylstilbestrol.

Amphenone was found to have antiestrogenic activity when tested for effects on estrogen stimulation of the chick oviduct (28). Earlier studies in this laboratory had demonstrated that progesterone also exhibits antiestrogenic activity (94). Amphenone was then tested for progestational activity in the rabbit. The compound was found to produce progestational proliferation of the rabbit endometrium (95).

In toxicity studies on rats, it was noted that higher doses of amphenone had an anesthetic effect. Studies on intravenous administration of the compound in the rabbit and dog showed that a deep level of anesthesia could be induced. Ovarietomies and hysterectomies were carried out under this anesthetic alone (96).

Chronic oral amphenone treatment in the rat produced enlargement of the adrenal cortex and had a gonitrogenic action similar to that of the

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sulfonamides and propylthiouracil (97). The hypertrophied adrenal gland of the rat shows histological and chemical evidence of marked lipid accumulation. The enlarged cells of the zona fasciculata and zona reticularis are filled with lipid but the glomerulosa is unchanged. The cholesterol content of the adrenal is increased to three times the normal level (98). The adrenal lipid accumulation produced by amphenone is prevented by hypophysectomy and by parenteral administration of cortisone (97, 99). The high level of adrenal cholesterol induced by amphenone is quite immobile to the effects of exogenous ACTH and the stimulation of endogenous ACTH production by cold exposure. On the other hand, adrenal ascorbic acid in these animals was depleted in response to ACTH (28). This lack of ACTH effect on adrenal cholesterol in amphenone-treated rats is in marked contrast to the lability of cholesterol in the normal rat adrenal stimulated with ACTH (35).

The liver glycogen level of the fasted amphenone-treated rat and the fasted adrenalectomized rat were both found to be at a low level. Cortisone administration caused deposition of liver glycogen in each group but amphenone treated animals did not have the degree of glycogen restoration found in the adrenalectomized animals (28).

Although histological and biochemical evidence indicated impaired adrenal cortical function in the amphenone-treated rat, the evidence was indirect. Direct evidence for amphenone depression of the rate of adrenal cortical secretion was provided by studies in the hypophysectomized dog in which chemical assay of the 17-hydroxycorticosteroid content of the adrenal vein blood showed that acute treatment with amphenone markedly reduced the response to exogenous ACTH (28, 29).

We have made a quantitative study of the 17-hydroxycorticosteroid content of the adrenal venous blood of dogs as follows: (1) hypophysectomized, given standard doses of ACTH and treated acutely with (a) amphenone or 1,2 bis(p-aminophenyl) 2-methylpropane-1,1-dihydrochloride, at several dose levels and at posttreatment intervals; (b) amphenone or 1,2-bis(p-aminophenyl)-2-methylpropane-1,1-dihydrochloride, a compound structurally related to amphenone; and (c) diethylstilbestrol dipotassium sulfonate, also structurally related to the preceding compounds; (2) intact and treated acutely with amphenone; and (3) intact treated chronically with amphenone, intact untreated controls, and intact chronically untreated and untreated controls. Normal healthy mongrel dogs of either sex were used in these investigations.

The transbuccal approach was used for hypophysectomy (107). The right lumbar adrenal vein was cannulated according to the technique described by Hume and Nelson (108).

The 17-hydroxycorticosteroid content of the dog adrenal vein blood was determined by a modification (81) of the method of Silber and Porter. Hydrocortisone has been found to be the major constituent of



dog adrenal vein blood (79, 80). The Silber-Porter phenylhydrazine method has been shown to be highly specific for 17,21 dihydroxy 20 ketosteroids such as hydrocortisone. Methylene chloride was used in the place of chloroform for steroid extraction. Duplicate samples of the methylene chloride extracts of adrenal vein blood were prepared. One sample was treated with the phenylhydrazine-sulfuric acid reagent, the other was treated with sulfuric acid reagent only. The samples were allowed to remain at room temperature for approximately 18 hours for full color development. Absorption was read in a Beckman Model DU spectrophotometer at a wave length of 410 mμ. Standards of 11 dehydro-17,21-dihydroxycorticosterone were run through the entire procedure. Results were recorded as micrograms of 17,21 dihydroxy 20 ketosteroids per 100 ml of blood. The rate of 17 hydroxycorticosteroid secretion for a given time interval could then be calculated on the basis of milliliters of blood collected during the time interval.

Results obtained from a group of 5 dogs demonstrate the marked inhibitory effect of acute intravenous amphenone on 17 hydroxycorticosteroid production after administration of a standard dose of ACTH. The rate of adrenal 17 hydroxycorticosteroid secretion in response to 10 milliunits of ACTH was first determined for a standard 10 minute interval. The mean response was  $67.3 \pm 24.6$  mcgm 17-hydroxycorticosteroids. Following this, a 10 milliunit dose of ACTH was given just after an acute intravenous dose of amphenone (50 mg/kg body weight). The mean response was reduced to  $8.7 \pm 3.0$  mcgm 17-hydroxycorticosteroids. In a group of 5 dogs studied for posttreatment effects of amphenone, the response to 10 milliunits of ACTH was significantly depressed one hour after acute intravenous amphenone. This depression of response to ACTH is seen even at 3 hours after amphenone treatment.

In a series of 4 hypophysectomized dogs treated acutely with amphenone (25 mg/kg body weight), the mean response to 10 milliunits ACTH before amphenone was  $60.3 \pm 23.0$  mcgm 17 hydroxycorticosteroids per 10 minutes. After acute intravenous amphenone, the response to 10 milliunits ACTH was  $19.1 \pm 7.9$  mcgm 17 hydroxycorticosteroids per 10 minutes. Although the corticosteroid depressant action of the compound at this lower dose was not as great as that seen at the higher dose, the effect is significant ( $P = .009$ ).

Experiments on the hypophysectomized dog in which a large dose of ACTH (40 U.S.P. units) was given indicate that the acute inhibitory action of amphenone can be reversed in one hour. This reversal of inhibition would appear to implicate interference by amphenone with steroidogenic processes which are stimulated by ACTH.

Amphene, a stilbene related to amphenone was also found to reduce the rate of secretion of 17-hydroxycorticosteroids in acutely treated hypophysectomized dogs. The mean output of 17-hydroxycorticosteroids



of 3 hypophysectomized dogs following 10 milliunits of ACTH was  $79.4 \pm 13.1$  mcgm per 10 minutes. When the same dose of ACTH was given just after amphenone (62.5 mg/kg), the output of 17-hydroxycorticosteroids was reduced to  $21.0 \pm 7.9$  mcgm per 10 minutes.

Experiments on hypophysectomized dogs, in which water-soluble diethylstilbestrol dipotassium sulfonate was given intravenously, show a lack of effect on 17-hydroxycorticosteroid secretion. This emphasizes the specificity of amphenone and its analogues in their depressant effect on the rate of adrenal cortical steroid secretion.

Studies on the intact dog after acute treatment with amphenone indicate that even though a high dose of amphenone (62.5 mg/kg) can markedly depress the endogenous corticosteroid output in the intact dog, the recovery from the depressant effect is fairly rapid.

The effect of chronic oral amphenone treatment (200 mg/kg daily) was investigated in the intact dog. After 29 days of treatment, adrenal vein blood levels of 17-hydroxycorticosteroids were reduced to levels found after hypophysectomy (4.3 to 8.1 mcgm per 10 minute sample). The adrenals did not respond to a large dose of ACTH (1 U.S.P. unit) either before or after hypophysectomy. This dose is 100 times that required to produce a marked stimulation of 17 hydroxycorticosteroid secretion in the acutely hypophysectomized dog.

At autopsy, the adrenals of the dogs on chronic amphenone treatment were found to be hypertrophied. Histological examination of the zona fasciculata reveals enlarged empty cells from which lipids had been extracted by organic solvents used for preparation of sections. The zona glomerulosa was not visibly damaged.

Dogs on chronic amphenone treatment lost as much as 20 per cent of their original body weight. The effect of reduced food intake was controlled by experiments in which untreated dogs were fed a reduced quantity of the standard diet used in these studies.

Results show that even though body weight losses were comparable in each group, chronic inanition alone does not reduce the rate of secretion of 17-hydroxycorticosteroids.

Our acute studies in the dog demonstrate an inhibition of 17 hydroxycorticosteroid secretion which is reversible either by high doses of exogenous ACTH or endogenous ACTH.

Chronic treatment with amphenone also results in a reduced rate of adrenal corticosteroid secretion similar to that seen in the untreated hypophysectomized dog. However, in this case, the adrenal secretory mechanism does not respond to treatment with large doses of ACTH. Thus the phenomenon of reversal of the amphenone effect in the acute procedure becomes an irreversible one in the chronically treated animal. Apparently, the lipid accumulation in the adrenal of the dog on chronic amphenone treatment is associated with decreased steroid synthesis and is not responsive to ACTH.

## A STUDY OF MEASUREMENT IN GROUP DYNAMICS LABORATORIES

by CYNTHIA CLARK WEDEL.\*

Laboratories in group dynamics, or group development, are being conducted in increasing numbers by various groups and organizations. Business firms, social and welfare agencies, educational institutions, and churches are adopting the laboratory technique as a part of training or management development programs. There is widespread subjective opinion that the laboratories are of great value, but there has been relatively little done in the way of attempts at objective measurement of the results or effectiveness of this method of training. This dissertation is a report of a three-year study, covering eighteen laboratories, seven conducted by the Department of Christian Education of the Episcopal Church, and one conducted under the joint auspices of the National Council of Churches and the National Training Laboratories.

The laboratory movement stems from the laboratories held each summer at Bethel, Maine, under the joint sponsorship of the Research Center in Group Dynamics of the University of Michigan, and the National Training Laboratories, which is associated with the Adult Education division of the National Education Association. Since about 1953, organizations which had sent people to the Bethel laboratories have been encouraged and assisted by the National Training Laboratories staff to experiment with adapting the methods used at Bethel to their own training programs and problems.

The Episcopal Church was one of the early groups to undertake its own laboratory program on a large scale. Beginning with an experimental laboratory in the summer of 1953, the program has grown until now it is conducted on a year-round basis, with from eighteen to twenty two week laboratories held each year. The laboratories are staffed by members of the Episcopal Church—chiefly clergy—who have attended a National Training Laboratory at Bethel, or one of the Episcopal Church laboratories. Participants in the laboratories are clergymen or bishops and a limited number of professional women church workers. Entitled "Laboratories on the Church and Group Life", these sessions seek to introduce the participants to the growing body of knowledge of the forces at work when people meet together in groups.

The laboratories employ three training methods or techniques. The basic one is known as the Training Group, which is a small, face-to-face group, which meets for two hours daily, with no predetermined

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agenda or structure, and with two staff members acting as "trainers". The trainers deliberately play a very passive role, acting chiefly as observers, in order that the members of the group may be free to try out and experience the effects of various types of behavior. The struggle to agree upon an agenda, to assume or assign leadership, to discover what others are expecting or thinking, complicated by the lack of any clearly understood task to be accomplished, creates a situation in which, in the course of the two weeks, almost every conceivable type of group behavior emerges. From this admittedly artificial and often frustrating and upsetting experience, a great deal of insight is gained into what goes on below the surface in almost any group.

The second method of training is the presentation, in a one-hour session each day, of some aspect of group dynamics theory. As far as possible this is designed to generalize and throw light upon the experiences in the Training Groups. These "Theory Sessions" are based on published reports of research in the field, and are presented by the staff with frequent use of group participation methods. Among the areas of information included are such topics as types of leadership, member roles, hidden agenda, acceptance and rejection, and the stages in group development.

The third teaching technique is drill or practice, in small groups, of many of the skills which have been found useful in working with groups. Such things as role-playing, the use of "buzz-groups," and the use of a process observer are practiced, as well as exercises designed to help the participants identify member roles, learn to deal with problem behavior in groups, recognize hidden agenda in themselves and others, and other forces which are commonly met with in group situations. These Skill or Practice Groups, which meet for two hours daily, are highly structured and directed by staff members, in sharp contrast to the Training Groups.

From the beginning of its laboratory program, the Episcopal Church has carried on attempts to measure what was happening in the laboratories. This was done primarily to secure some objective evidence as to the effectiveness of the program, in order to decide whether or not it should be continued. Since this whole area of activity was new to the church, it was also felt that objective findings would have value in convincing others of the worth of the program and securing the necessary support for it. As other groups have begun to experiment with laboratories, many of them have turned to the Episcopal Church for help in the field of measurement and have asked permission to use the tests described herein. In spite of the obvious limitations and imperfections of these instruments, it has become increasingly clear that they were the only ones readily available for use by groups without skilled research personnel. Therefore, a concern which was not foreseen at the be-



ginning of the program has developed to improve, simplify, and standardize these tests so that they may be as useful as possible to many groups. In spite of widespread research into many of the specifics of group dynamics, this appears to be the first attempt at a long-term evaluation of the laboratory technique of training.

It must be noted that this project is one of exploration, rather than of the testing of a specific hypothesis about laboratory training, or the development and use of a particular measuring instrument. This report suggests various tentative hypotheses about the effects of laboratory training, and describes the tests devised to check some of the hypotheses and to measure some of the changes which may have occurred. More questions are raised than are answered, but a number of "leads" have been found which may prove of value to the growing laboratory movement.

Four hypotheses were selected for testing. These are (1) that there will be a measurable change in the laboratory members' opinions or attitudes about what constitutes a good group; (2) that there will be a measurable change in the area of interpersonal relations—specifically in the ability to correctly perceive the judgments of others in the group; (3) that there will be a change in the understanding of oneself in the role of group leader; and (4) that the effects of the laboratory will still be apparent to the participant after the lapse of a considerable period of time.

The first test reported on is an opinion blank entitled "Characteristics of a Good Group". This consists of twenty statements about groups which are to be graded by the members on a five-point scale as descriptive or not descriptive of a good group. Results are given for seventeen laboratories, with a total of 685 individuals, each of whom took the test at the beginning and again at the close of a laboratory. The differences between the mean scores on the first and second administration of the test at each laboratory were secured, and tested for significance. According to the hypothesis, the scores should have increased on the second administration. This was true in every case. In four laboratories the increase was not statistically significant. In three laboratories the difference was significant at the 5 or 2 per cent level, and in the remaining ten it was a highly significant difference. The test seems to be a fairly satisfactory device for measuring a change in opinions about groups. The data now available indicates what might be an average amount of change in this type of laboratory. It suggests the possibility that more intensive study should be made of those laboratories which deviate sharply from this average, to try to determine what factors such as staff, personnel, or slight variations in program, may account for the deviation.

The second hypothesis had to do with changes in the area of inter-

personal relations. In early laboratories a sociometric test was used, and the specific hypothesis being tested was one already propounded by another experimenter. This was that in the early stages of a group's life, members would not be able to make objective judgments of one another, but would tend to judge as most intelligent those whom they liked best. When the group had been together over a period of time, and become a mature group, members would be much more objective in their judgments, and there would be less correlation between judgments of "liking" and of "most intelligent". The results of these sociometric tests are not reported here. In later laboratories, an original test called a "Test of Social Perception" was used. It was designed to measure two things (1) does the laboratory experience improve the ability of the members to guess accurately how another will rate them? and (2) as a group matures and becomes more cohesive, do the members tend to feel threatened by others whose behavior might endanger the good functioning of the group? Results on this test are reported for fourteen groups in five laboratories.

A social perception score, which was the total of correct guesses as to how another would rate him on three characteristics of group membership, was secured for each individual. Of 113 individuals, sixty-eight (60 per cent) showed an increase in score on the second administration of the test. When correct choices were compared by groups rather than by individuals, 64 per cent of the differences between the first and second administrations were in the predicted direction. Only a small fraction of these differences were significant, however, so no conclusions can be drawn from these results. Since a major purpose of this entire project was to experiment with possible tests, and since the data was readily available, correlations were worked out between the social perception scores and scores secured by individuals on the three characteristics of group membership which were included in the tests. These characteristics are (1) responsible member of the group, (2) willingness to listen, and (3) dominating or submitting. It was thought that a person whose sensitivity to others was increased by the laboratory experience, as measured by the social perception score, might be seen by them as a more helpful member of the group. However, no consistent relationships were found between these various scores.

In using this test to answer the second question (as a group matures do the members tend to feel threatened by others whose behavior might endanger the good functioning of the group?), scores were secured for each individual on each of the three characteristics of group membership. Each person had also been ranked by each other person according to the criterion "With which of these people would you prefer to spend your leisure time?" This was considered a measure of whether or not the person was looked upon as "threatening". Rank order corre-

lations were done, with the hypothesis that on the first administration of the test, when the group was new and had presumably developed no group feeling or loyalty, there would be no particular correlation between scores on the characteristics and choice as leisure time companions. At the time of the second administration, however, it was postulated that there would exist some real concern for the good of the group and that those who were scored favorably on the characteristics of group membership would be seen as nonthreatening to the life of the group, and would be more frequently chosen as leisuretime companions. In this case the correlations should be noticeably higher. This hypothesis was not upheld. In fact, such evidence as there was of any relationship between the correlations on the first and second administrations of the test was in the opposite direction. This might, in fact, be looked upon as indirect evidence in favor of the hypothesis which had been tested earlier in the sociometric test.

This test proved in general unsatisfactory. It was too complicated, which made for careless and inaccurate marking by the participants, and for very difficult scoring. The inconclusive nature of the results suggests that it did not measure any real area of change.

The third hypothesis, that there would be a change in the picture of the self as a leader, was tested by a question asked at the beginning and again at the end of the laboratory. The question, which was included in two brief questionnaires about the laboratory, was, "Briefly describe yourself as a leader of adult groups, noting your strengths and weaknesses." Results on this question are reported for eleven laboratories, including 467 individuals. The replies, of course, came in many different forms, and were not readily susceptible of statistical handling. A content analysis was made of them, however, and a scoring chart devised. The replies seemed to fall into five groups, each of which indicates a particular area of concern in leading a group. These areas were (1) democratic group process, (2) needs of individuals in the group, (3) running an orderly meeting, (4) keeping peace, and (5) selling one's own ideas to the group. Numerical values were assigned to each of these categories on a ten-point scale, and the replies were then scored. The total and mean scores of each laboratory on each administration were obtained, and the differences between the means tested for significance. All were significant at the 1 per cent level. This was assumed to indicate that a real change took place in what the members considered their chief concern as a leader of a group. It must be pointed out that the scoring of these tests was of necessity very subjective on the part of the experimenter, and that too great confidence cannot be placed in the results. However, the test seems to have three definite values. First, in spite of the hazards of subjective scoring, it seems to indicate real change in the desired direction. Second, it is believed that



the five scoring categories, which emerged very clearly in the content analysis, are an original classification of group leadership concern, and may be of value in further study of group life. Third, many of the replies given on the test, samples of which are included in this report, could provide good material for future tests of the check-list or Q-sort variety.

The final measuring instrument, designed to test the long-term effect of laboratory training, was a questionnaire sent to 477 participants in the first nine Episcopal laboratories from six months to two and a half years after their laboratory experience. A surprising return of 333 questionnaires, or 70 per cent, was noted. With the exception of two, all stated that the laboratory had made a change in their subsequent behavior or attitudes. If it is assumed that no change was felt by those who did not reply, this is still a large percentage of the total who did experience a long-term change. No statistical handling of this questionnaire was possible.

The most significant item on the questionnaire was one which asked those who felt that there had been a change in their attitudes or behavior to give a brief example of such change. These replies were classified under nine categories (1) self understanding, (2) relation to others, (3) theological insights, (4) understanding of group dynamics methods, (5) relations to family, (6) physical reactions, (7) relations to vestry, (8) relations to other parish groups, (9) general comments. A rather detailed listing of the replies under these nine categories is given in the report. These are felt to be of great importance, because the ultimate value of the laboratory program lies not in what happened at the laboratory, but in changed behavior on the part of participants after they returned to their regular activities. As far as the writer knows, no previous attempt has been made to follow up the results of laboratories after a period of time. Granted that the reports are subjective and may often indicate greater change than is obvious to observers, it is important to know that so many people felt that they had changed and to get a picture of the many ways in which the change is manifested. As those responsible for laboratory programs are enabled to see the areas in which change seems to occur, it may be possible to sharpen the program to enhance such change or to direct it to areas which it does not now seem to affect.

In conclusion, this experiment in measuring the effects of group dynamics laboratories seems to have accomplished the following results. It has provided a variety of evidence that the laboratories have had a measurable effect on the participants, including effects which are still felt after a lapse of time. It has produced one rather precise statistical instrument (the opinion test), and two general open-ended instru-

ments (the pre- and post-laboratory questions and the long-range follow-up questionnaire) which are worth using for further study. The fourth instrument, the social perception test, is not good in its present form, but may lend itself to revision which will make it more useful. The data which has been gathered and reported here is of great value to the Episcopal Church program, and may prove of value to others who are planning and conducting laboratories.

## THE INFLUENCE OF VARIOUS METABOLITES ON THE GROWTH OF *COXIELLA BURNETII* IN MONOLAYER CULTURES OF CHICK EMBRYO ENTODERMAL CELLS

by VIRGINIA LEE BLACKFORD\*

The metabolic interrelationships between rickettsiae and other obligate intracellular parasites and their host cells have been the subject of speculation for many years. Reliable data, however, have begun to accumulate only recently in this field. The work of Bovarnick and Snyder opened a new era of investigation with the demonstration of an enzyme system in the rickettsiae.

Little attention has been paid to the effects of individual metabolites on these parasites and at present information is lacking, or meager, on the specific role of these metabolites.

This investigation is concerned with the growth of *Coxiella burnetii*, the causative agent of Q fever, in monolayer tissue cultures of chick entodermal cells and the application of quantitative methods to the study of multiplication of this group of agents under the influence of certain metabolites.

The effect of components of some of the commonly used tissue media on the growth of *C. burnetii* was investigated. Host cells nourished with 25 per cent rooster serum diluted in Morgan's mixture 199 (CS<sub>m</sub>199) developed colonies comparable to those receiving Hanks' balanced salt solution (CS<sub>m</sub>BSS), but the focus count was distinctly lower. Similarly, Eagle's medium retarded multiplication of *C. burnetii*. When the three groups of constituents of Eagle's medium were examined separately, the amino acids and glutamine were shown to be highly inhibitory while the vitamins had no effect. A preliminary experiment using yolk sac constituents diluted in CS<sub>m</sub> indicated enhancement of infection.

Weiss and Pietryk reported that serum was not essential and were able to demonstrate good growth using only mixture 199 without serum. A series of preliminary experiments was conducted to determine the need for serum. In one experiment in this study the host cells were grown in BSS without serum. The cells migrated as actively and stained with the same magnitude of intensity as those receiving serum, but failed to support the growth of rickettsiae even though the growth fluid was replaced with CS<sub>m</sub>BSS and the rickettsial suspension. In another experiment cells were grown in CS<sub>m</sub>BSS and infected with rickettsiae diluted in BSS without serum; marked rickettsial inhibition

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again resulted. In a third experiment the cultures were grown in CS<sub>2</sub> diluted in "conditioned" medium and good cellular growth resulted. The growth fluids were replaced with a mixture consisting of rickettsiae and BSS, without serum but enriched with 0.3 mg of coenzyme A (CoA). The added CoA did not replace the essential growth factor of the serum and marked inhibition was noted. These data prove that serum is necessary for the growth of *C. burnetii*.

Factors in whole serum which might influence the growth of the rickettsiae, as well as the physiological state of the host cells, were of interest. Several experiments, using either chloroform-extracted or dialyzed sera, were designed to study these factors. Lipids which might possibly have been toxic were eliminated by chloroform extraction. Cultures grown in extracted rooster serum and BSS grew as well as cultures receiving whole serum and BSS, but the growth of *C. burnetii* was markedly inhibited by the removal of chloroform-soluble components from the serum. Treated serum was enriched with either mixture 199 or Eagle's medium on the assumption that these complex tissue culture media might serve as a substitute for the components lost in extraction. The inhibitory action was not alleviated by the addition of these media. The combination of the two factors, chloroform treatment of the serum and mixture 199, produced an even more marked reduction in focus count. The host cells were not greatly affected by the changes in media. Judging by the observed migration of the cells and their intensity of staining, the activity of the cells was possibly enhanced by mixture 199 and by chloroform treatment of the serum.

The substitution of dialyzed rooster serum for whole serum also resulted in reduced rickettsial growth and wide differences among identically treated cultures. Since Na pyruvate has been shown to enhance the growth of *C. burnetii*, it was of interest to determine whether the inhibition exhibited with dialyzed serum could be obscured by the enhancing action of pyruvate. Dialyzed serum was tested with various concentrations of pyruvate known to have either an inhibitory or enhancing effect. The failure of dialyzed serum to support the growth of this micro-parasite was not overcome by the presence of pyruvate regardless of the concentration used. In another experiment both the dialyzed serum and dialysate were enriched with 1.25 mM ml of pyruvate and tested for their ability to support the growth of *C. burnetii*. The dialyzed serum, containing the high molecular weight moiety, slightly, but not significantly, resulted in decreased rickettsial growth while with the dialysate the growth was reduced to a very low level.

Moulder and his co-workers showed that the growth of feline pneumonitis virus in the yolk sac, maintained *in vitro*, was enhanced by the

addition of the adenosine triphosphate (ATP), diphosphopyridine nucleotide (DPN), Na pyruvate, and Na malate. Suggestions of a similarity between the large viruses and rickettsiae prompted an investigation of the effect of these metabolites on the growth of *C. burnetii*. With the concentrations used by Moulder for enhancement the rickettsiae were markedly inhibited. When the concentration of the metabolites was reduced to one half or one fourth, the inhibitory effect was eliminated, but an enhancing action was not obtained. Thus, the effect of each of these compounds was studied separately. None of the compounds used exhibited an enhancing action as demonstrated with feline pneumonitis. In one small experiment malate appeared to have no effect. ATP was inhibitory at the higher concentration while at the lower concentration the inhibitory effect was eliminated but enhancement was not demonstrated. The results with DPN and pyruvate will be discussed later.

Singer suggested that sulphydryl compounds are necessary for rickettsial multiplication and survival. This suggestion was an intriguing one and it was tempting to examine the influence of glutathione (GSH) on the growth of *C. burnetii*. A detailed study suggests that this compound may have some metabolic activity which cannot be clearly defined. In one preliminary experiment GSH did not produce an obvious effect on focus count. A marked variation was experienced with 0.03 mg/ml. The general trend encountered with other compounds has been a marked inhibition of rickettsial growth with high concentrations of the added substrate and an enhancing effect with low concentrations. The same trend was demonstrated in one experiment with GSH, but the inhibition is not as great as encountered elsewhere. In another experiment this trend was not contradicted. In a later study the opposite phenomenon was produced, rickettsial growth being inhibited by 0.03 mg/ml.

Certain compounds, which have been shown by other investigators to have metabolic activity for rickettsiae, were investigated to show their effect on the growth of the Q fever rickettsiae. Hexokinase and adenosine diphosphate (ADP) displayed no activity toward this micro-parasite in the tissue culture system. The results of the egg infectivity assay using supernatant fluids from the cultures receiving hexokinase or ADP as an added substrate are in agreement with the focus count.

Glutamate was used both as the potassium and sodium salts. Both salts had a marked detrimental effect on the host tissues. K-glutamate was inhibitory, although, in general, rickettsiae are more stable in the presence of potassium. Na-glutamate exhibited an inhibitory action on the growth of *C. burnetii* as determined by focus count. The results were not demonstrated by egg infectivity assay.

The results obtained with CoA followed, in general, the trend noted with other compounds. In relatively high concentrations, 10 mcg/ml.



and 3 mcg/ml, CoA was inhibitory. This inhibitory effect disappeared when the concentration was reduced to 0.5 mcg/ml. The failure of 5 mcg/ml (Group III) to inhibit the growth of the rickettsiae cannot be explained and is possibly due to an experimental error. The results of the infectivity assay, while not statistically significant, are in agreement with the focus count. In an additional experiment 70 mcg/ml of CoA markedly inhibited rickettsial growth while lower concentrations had no effect on focus count. The absence of an inhibitory action by amounts approximately equivalent to those used in the earlier experiment may be explained by changes in protocol. The host cells used in the earlier experiment were grown in "conditioned" medium and inoculated with a medium consisting of CS BSS, the desired dilution of rickettsiae, and the metabolite. In the later experiment the cells were grown in 10 per cent rooster serum diluted in a modified balanced salt solution (CS<sub>2</sub>MBSS) enriched with 1.25 mM/ml of pyruvate, washed with MBSS, and then inoculated with a medium consisting of CS<sub>2</sub>MBSS enriched with 1.25 mM/ml pyruvate, the rickettsiae, and the desired concentration of CoA.

The rickettsiostatic effect of para-aminobenzoic acid (PABA) has been demonstrated by many investigators. *Coxiella burnetii* has not been shown to be affected by PABA. In our system PABA proved to be inhibitory in concentrations of 200 mcg/ml and 80 mcg/ml. Forty mcg per ml had no effect on the growth of *C. burnetii*.

Two compounds, DPN and pyruvate, have been studied in some detail. In one experiment concentrations of 0.1 and 0.05 mM/ml of added DPN were inhibitory. DPN appeared to follow the trend observed with other compounds; thus, amounts only one fourth the inhibitory concentration, 0.0125 mM/ml, were shown to enhance the growth of rickettsiae. These results are in disagreement with an earlier experiment in which an effect was not demonstrable. The discrepancy between these two experiments was assumed to have resulted from the use of two lots of DPN, differing widely in purity. Apparently this was not the case since in five additional experiments the enhancing action demonstrated earlier has not been reproduced. Variations in the concentrations of DPN, DPNase, or other compounds involved in DPN metabolism in the host cells or rooster serum may possibly be responsible for the inability to obtain reproducible results with this compound.

In contrast with DPN, the effect obtained with pyruvate was reproducible. Added pyruvate exhibited consistent activity. Inhibition or enhancement was obtained within a very small range of concentrations, 10 to 2.5 mM/ml. In some of the experiments the optimal concentration for enhancement was shifted from 2.5 to 1.25 mM/ml.

Glucose has not been shown to be utilized by either rickettsiae or by the host endodermal cells. On the other hand, Ormsbee noted that



*C. burnetii* actively oxidizes pyruvate. The early studies here presented also suggested the importance of pyruvate as a growth factor for this micro parasite, but the value of glucose in the medium was not discernible. From the evidence it seemed feasible, therefore, to omit glucose from the basal medium by modifying Hanks' BSS. The enhancement of rickettsial growth under the influence of pyruvate alone was more striking than in previous experiments.

Certain modifications were introduced in this series of experiments. In two experiments the cultures were grown in CS<sub>10</sub> and Hanks' BSS, washed in MBSS, enriched with 0.1 per cent pyruvate, to remove residual growth fluids, glucose, or tissue components which may have diffused into the surrounding medium, and the fluids were replaced with a mixture consisting of CS<sub>10</sub> diluted in MBSS, rickettsiae suspended in MBSS, and the desired concentrations of pyruvate. Enhancement was shown with concentrations of 10 mM and 5 mM/ml of added pyruvate as well as with the lower concentrations. In two experiments the host cells were grown in MBSS enriched with 1.25 mM/ml pyruvate, washed, and the fluids replaced with a mixture consisting of CS<sub>10</sub> diluted in MBSS, rickettsiae, and the desired concentrations of pyruvate. With the exception of the group receiving 10 mM/ml, which was inhibitory, the enhancing effect of added pyruvate was lost. This suggested that the noninfected cells, during growth, probably take up and retain sufficient pyruvate from the growth fluids to satisfy the requirement of rickettsiae. The control group, therefore, without added pyruvate readily supports growth while the groups receiving added pyruvate may acquire an excess which either obscures further enhancement or reaches a level which may be toxic.

Glucose and pyruvate were omitted from both the growth and test media in some experiments. Chicken serum diluted in MBSS supported the growth of *C. burnetii*; the focus count was higher than in the glucose control and approximately as high as in the cultures receiving pyruvate as their carbon source. These data suggested an antagonistic action between glucose and pyruvate. It was not known whether added pyruvate enhanced the growth of the rickettsiae or simply relieved the inhibition possibly produced by an excess of glucose. To demonstrate the effect of pyruvate in the absence of glucose, cells were grown in MBSS and serum, washed with MBSS, and infected in the usual manner with graded amounts of pyruvate. Results comparable to those obtained in earlier experiments were obtained: no effect with 10 mM or 5 mM/ml but statistically significant enhancement with 1.25 mM/ml pyruvate.

The action of glucose was studied and glucose proved to be inert even in the overwhelming amount of 75 mM/ml which is approximately 13 times the concentration found in Hanks' BSS. These data indicate that the action of pyruvate is one of true enhancement.

The isolation of an impurity in samples of commercially prepared Na pyruvate which inhibited the tricarboxylic acid cycle in isolated mitochondria has been reported by other investigators. These reports and the possibility of the presence of contaminating impurities in commercial preparations of pyruvate suggested investigation of this possibility. A sample of Na pyruvate was recrystallized according to the method of Lipmann. Parallel tests were set up using the commercial and recrystallized pyruvate. Comparable results were obtained in both series. The loss of the enhancing action of pyruvate, shown in earlier experiments, was again demonstrated by growth of the host cells in either regular or recrystallized material. These data present evidence that the pyruvate preparation used throughout this study was of the maximum purity.

## COMPARATIVE STUDIES OF THE HUMAN, MOUSE, AND GUINEA PIG SALIVARY GLAND DISEASE VIRUSES

by IANET WILSON HARTLEY\*

A pathological condition consisting of remarkable cellular enlargement accompanied by eosinophilic intranuclear inclusion bodies has been noted with varying frequency in the salivary glands of man, chimpanzees, monkeys, guinea pigs, mice, rats, hamsters, and moles. For several of these, a specific viral etiology has been established. Investigation of the viruses inducing this lesion was limited for many years to observations of morphological aspects of the inclusions and the *in vivo* behavior of each virus in its natural host. Although the result of human infection was recognized in the disseminated and usually fatal disease of the newborn known as cytomegalic inclusion disease, it was also realized that presence of the virus in lower animals was almost exclusively manifested as an inapparent infection. However, early animal transmission experiments revealed that young animals inoculated by an extraordinary route, for example, intracerebrally or intraperitoneally, would succumb to a severe, generalized infection.

Because of the strictly species specific nature of the viruses, it was not until the successful application of tissue culture virus isolation techniques to the mouse and human salivary gland viruses that any attempt could be made to compare the viruses of different species under relatively similar conditions. This use of tissue culture methods also led to the development of serological tests for the human virus which, with the isolation of virus from apparently healthy individuals, provided evidence of a situation analogous to that seen in lower animals, i.e., the existence of widespread infection in the absence of overt disease.

As a means of estimating the usefulness of laboratory studies using the salivary gland viruses of lower animals as experimental models of human infection, it was felt that more complete evidence of the intrinsic similarity of the agents could be obtained by comparison of the tissue culture isolates of the human and mouse viruses and that more valid conclusions could be drawn if a third agent, the salivary gland virus of guinea pigs, were propagated in tissue culture and included in the study.

An agent producing cytopathic changes similar to those seen with mouse and human salivary gland viruses was isolated by the inoculation of a suspension of infected guinea pig submaxillary glands into tissue cultures of guinea pig embryo fibroblasts. Similar isolations were ob-

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tained on several occasions from two guinea pig passage lines, and two strains of virus (designated Strain 1 and Strain 2) were eventually established in serial tissue culture passage. The viruses produced in tissue culture the pathognomonic intranuclear inclusion bodies of salivary gland virus infection. Subcutaneous inoculation of Strain 1 tissue culture passage virus into young guinea pigs caused the formation of the diagnostic lesion in the submaxillary glands, and virus was recovered when suspensions of the glands were inoculated into tissue culture. That the guinea pigs employed were not natural carriers of the virus was indicated by uniformly negative pre-inoculation salivary gland biopsies. Tissue culture virus inoculated intracerebrally into young guinea pigs produced an acute, fatal meningitis accompanied by inclusion body formation on mononuclear cells of the meningeal exudate.

Comparative studies were carried out of the growth characteristics of the mouse, guinea pig, and human viruses in their respective tissue culture systems, i.e., mouse, guinea pig, and human embryo fibroblasts. The following similarities in *in vitro* behavior were noted for the three agents: (1) production of similar cytopathic changes and acidophilic intranuclear inclusion bodies in fibroblastic cells; (2) shortening of incubation periods when whole or ground cells were included in the inoculum; (3) increased adaptation to growth in tissue culture on continued passage, as evidenced by decreasing incubation periods, more rapid progression of cytopathic effects, and appearance of virus in supernatant fluid; and (4) apparent relation of incubation period to virus titer. Cytopathic effects produced by each virus were observed only in tissue cultures of the homologous species.

Similarities in physical properties were also striking. All three agents were sensitive to ether, heating at 56 C for 10 or 20 minutes, freezing and thawing, and prolonged storage; they were filtrable with some loss in activity, and relatively stable from pH 9 to 5 and inactivated at pH 4. All were unable to agglutinate chicken or homologous species red blood cells.

The observation that tissue cultures infected with mouse and guinea pig salivary gland viruses elaborated a complement fixing antigen permitted the development of a convenient, specific serological test similar to that already available for the human virus. The most satisfactory antigens were obtained from cell homogenates of cultures harvested at the time of maximum cytopathic effects. Significant increases in complement fixing antibody titers were demonstrable in paired pre- and post-inoculation sera from animals infected or hyperimmunized with tissue culture or animal passage virus. Complete reciprocal tests carried out with various antigen preparations of the three viruses gave no evidence of antigenic relationship.

Neutralization tests with the mouse and guinea pig agents could be performed in tissue culture when the test virus consisted of the supernatant fluid from a lightly centrifuged preparation of culture fluid containing resuspended ground cells, harvested at the time of severe cytopathic changes. The appearance of neutralizing antibody was demonstrable in mice and guinea pigs inoculated with the homologous animal or tissue culture passage virus. Serological studies with the guinea pig salivary gland virus revealed a difference in neutralizing capacity of immune sera produced by the two strains carried in animal passage. It was noted consistently, in the limited number of sera tested, that sera from guinea pigs infected with Strain 2 virus, although having high titers of complement fixing antibody, were negative or had very low levels of neutralizing antibody when the sera were tested against either Strain 1 or Strain 2.

Reciprocal neutralization tests employing the mouse, guinea pig, and human salivary gland viruses in tissue culture gave no indication of cross reactivity.

It appears, therefore, that the three viruses studied are biologically closely related but immunologically distinct. The cultural behavior of the agents, as well as their serological individuality, confirms the species specific nature of the agents recognized from the host range studies of earlier investigators.

In an attempt to determine the significance of complement fixing antibody as an index of salivary gland virus infection, the frequency of antibody in adult animals of several guinea pig colonies was compared with the incidence of salivary gland inclusions in the same animals. Of the three guinea pig stocks in which significant numbers of observations were made, one was found to be infection-free by both criteria, one had a low incidence (7 per cent inclusion-positive, 45 per cent complement fixation-positive), and the third had a moderately high incidence of infection (17 per cent inclusion-positive, 92 per cent complement fixation positive). Complement fixing antibody was three to six times as prevalent as inclusion bodies; the correlation of antibody and inclusions was one directional, with the great majority of animals carrying salivary gland inclusions also having high titer complement fixing antibody.

The age distribution of submaxillary gland inclusions and complement fixing antibody was determined in guinea pigs from two colonies, representing a low incidence stock from an experimental animal colony, and a relatively high incidence stock from a commercial dealer. The age range in the former group was less than 3 weeks to over 8 months; in the latter group, it was less than 4 weeks to over one year. No inclusions were found in very young animals from either colony; low titers (1:8) of complement fixing antibody were detected and were

considered to be the result of maternal transfer. In the low incidence group inclusions were not found until after 8 months of age, but a rare animal (5 to 6 per cent) between 4 weeks and 5 months of age had detectable antibody. In contrast, in the high incidence colony approximately 30 per cent of guinea pigs in the age range 4 weeks to 8 months had serological evidence of infection, accompanied in most instances by inclusion bodies. In the 4 to 8 months group the correlation of antibody and inclusions was complete. In both colonies, a marked increase in the frequency of antibody positives was found in animals more than 8 months old but this increase was not paralleled by a corresponding increase in inclusions.

Thus, in animals apparently in the primary, active stage of infection, at least in a colony with a relatively high frequency of natural infection, the presence of complement fixing antibody was found to be an efficient index of the presence of submaxillary gland inclusions. The lack of inclusions in association with high titer complement fixing antibody in older animals may be explained by the presence of only small numbers of inclusions which might be missed in sectioning or overlooked in microscopic examination, or by the eventual dissolution of inclusions with age. The differences in the two colonies in time and appearance of inclusions and antibody, and incidence of infection, are probably reflections of different environmental conditions.

It was observed incidentally that complement obtained from five commercial sources was uniformly positive when tested as serum against the guinea pig salivary gland virus antigen; titers were 1:64 or greater. As a consequence, for complement fixation tests with the guinea pig virus it was necessary to use, for complement, serum from animals in the antibody-free stock.

The failure experienced by many investigators in attempts to reproduce in serial passage the fatal, generalized disease occurring in susceptible animals when salivary gland virus is introduced intracerebrally or intraperitoneally led to an attempt to elucidate in the mouse some of the factors of virus-host relationship operative under these conditions.

Comparative titrations were carried out in mouse embryo tissue culture and in one-day old and adult mice, inoculated intracerebrally and intraperitoneally. Titration endpoints in mice were determined by death of the animals and by the development of characteristic inclusion bodies in the salivary glands two weeks after inoculation. The titers attained in the various systems indicated a sensitivity gradient for detection of virus infection. The most delicate indicator of infection was the production of inclusion bodies in the salivary glands of one-day old mice inoculated intracerebrally, titers reaching  $10^{7.5}$  50 per cent tissue culture infectious doses per 0.1 ml. Young mice inoculated intraperi-



toneally were almost equally sensitive, followed, with about 1 log decrease in titer, by cytopathic effect in tissue culture and inclusion body formation in adult mice inoculated intracerebrally or intraperitoneally. Using death as the end-point, one-day old mice inoculated intracerebrally were 1 to 1.5 logs less sensitive than tissue culture, followed by young mice receiving virus intraperitoneally, adult mice intracerebrally inoculated, and adult mice intraperitoneally inoculated. From these data it is obvious that very large amounts of virus are required to produce acute generalized disease in adult animals.

In attempting to explain the failure of serial transmission of acute illness, it was necessary to determine whether virus multiplication takes place in artificially infected animals at any site except the salivary glands. In two experiments, adult mice were inoculated intraperitoneally with undiluted salivary gland suspension; animals were sacrificed daily and pools of liver and spleen titrated in mouse embryo tissue culture. Portions of liver, spleen, and salivary glands were fixed in preparation for sectioning and staining. In the first experiment the virus dose used contained an amount of virus just below the critical level for producing generalized infection in adult mice by this route, determined as approximately 5.5 logs in the studies described previously, and no clinical disease was noted. Results of the titrations indicated a constant, low level of virus throughout the observation period, varying from  $10^1$  to  $10^2$  TCID<sub>50</sub> per 0.1 ml. On the seventh day after inoculation, inclusions were present in the salivary glands and were found through the tenth day; inclusions were not observed in sections of liver obtained from the seventh through tenth day. In the second experiment, employing a virus dose of 7.6 logs, generalized fatal disease was achieved and virus multiplication was detected at levels approaching those required to produce clinical symptoms. Inclusion bodies were detected in the liver within 24 hours after inoculation and in the spleen on the fourth day. No inclusions were found in salivary glands examined on the third and fourth day.

These results indicate that virus multiplies in the viscera in both benign infection and overt disease induced by intraperitoneal inoculation, with the highest titers being obtained in mice receiving large doses of virus. However, if the amount of virus produced and released in visceral organs is limited to the threshold levels detected in this study, it will be difficult to achieve consistent serial passage of fatal infection.

The combination of tissue culture techniques and the utilization of the mouse and guinea pig salivary gland viruses as model systems would appear to be a hopeful basis for further experimentation designed to determine the pathogenesis and epidemiology of human infection.

## A STUDY OF THE EFFECTS PRODUCED BY PURINES AND RELATED COMPOUNDS ON VIRUS PROPAGATION

by ARIEL CAHILL HOLLINSHEAD\*

In the last two decades there have been spectacular advances in the treatment of diseases caused by bacteria, but there is no acceptable chemotherapy for any of the diseases caused by the true viruses. The search for effective agents is more difficult than in the case of bacteria because the metabolism and reproduction of viruses is so intimately dependent upon the metabolism of the host. The essential problem is to find agents that will be so selective that they are capable of entering the cell and interfering with virus replication without irreversible harmful effects on the host cell.

Considerable evidence suggests that the nucleic acids of viruses are essential to their reproduction. As a corollary, compounds that interfere with virus nucleic acid formation probably will reduce virus replication. This suggests attempts to inhibit viruses by analogues of the bases of nucleic acids, purines and pyrimidines. The existing information concerning virus chemotherapy by purine analogues suggested that this was a fruitful area for further investigation.

Purine analogues may inhibit viruses in several ways. They may interfere with the formation of purines or with their incorporation into nucleic acids, or they may be incorporated into the nucleic acids, thus forming an unnatural nucleic acid unable to produce virus.

In the present study a large number of purine analogues was tested for their capacity to inhibit poliovirus in tissue cultures of monkey tissues. Effective compounds were tested against the same virus in human HeLa cells and against influenza virus in chick chorioallantoic membrane tissue cultures. Some also were tested against one of the adenoviruses and some in infected mice. The mechanism of action of the more active compounds was studied further.

Nineteen purine analogues were found to be significantly effective against poliovirus inoculated into monkey testicular explant tissue cultures 24 hours previous to addition of serial drug dilutions. These included three substituted purines, a benzothiazole, three quinoxalines, and twelve benzimidazoles. These compounds were tested further for their inhibitory activity in pre-infected monkey kidney monolayer tissue cultures and HeLa human carcinomal cell cultures.

All twelve benzimidazoles exhibited some virus inhibitory activity in the monkey kidney monolayer tissue culture system, the more active

\* A.B. 1951, Ohio University; A.M. 1955, The George Washington University; Ph.D. conferred October 10, 1957. Professor in charge of research: Paul Kenneth Smith, Professor of Pharmacology.

compounds being 4-methoxy-6-nitrobenzimidazole, 4-amino-6-ethoxybenzimidazole, and 2-(1-hydroxybenzyl)-benzimidazole. Eight of the benzimidazoles also were partially active in HeLa tissue cultures, the more active being 4-amino-6-ethoxybenzimidazole and 2-(1-hydroxybenzyl)-benzimidazole. Two nitro-quinoxaline compounds were effective against poliovirus in the three tissue culture systems, and one was effective in monkey testicular and kidney tissue culture. 1-Phenyl-4-anilinopyrazolo-(3,4d)-pyrimidine, isoguanine, and 2-(p dimethylaminophenyl)-benzothiazole were effective in all three systems.

The compounds were compared for their activity in monkey kidney monolayer tissue cultures against influenza virus, poliovirus, and adenovirus. Six compounds were active against all three kinds of virus; these were 4-amino-6-ethoxybenzimidazole, 2-(p-dimethylaminophenyl)-benzothiazole, 2,3-dimethyl-7-ethoxy-5-nitroquinoxaline, 2-(1-hydroxybenzyl)-benzimidazole, 4-methoxy-6-nitrobenzimidazole, and 6-methoxy-4-nitrobenzimidazole. 4-Methoxy-6-nitrobenzimidazole and 2-(1-hydroxybenzyl)-benzimidazole showed more activity against adenovirus, and 2,3-dimethyl-7-ethoxy-5-nitroquinoxaline showed more activity against both adenovirus and influenza virus than against poliovirus. These results were remarkable in that none of the other groups of active compounds in other categories, when tested in this manner, showed activity against all three kinds of virus in kidney tissue culture.

Six compounds had a ratio of four or more in influenza virus-infected chick chorioallantoic membrane tissue cultures. The drugs were four to eight times more toxic for the chorioallantoic membrane tissue culture system than for testicular tissue. Three benzimidazoles and a benzothiazole were effective against the virus infections of both systems, although each compound was quite different in its range of effectiveness in the two systems. It is of interest that 2-(1-hydroxybenzyl)-benzimidazole, one of the compounds most effective against influenza virus-infected chorioallantoic membrane cultures, was ineffective against influenza virus-infected kidney tissue cultures.

In some cases pretreatment with the benzimidazoles slowed the appearance of poliovirus but in no case did it prevent the eventual appearance of virus on the cultures washed free of the compounds. Two of the quinoxalines and 1-phenyl-4-anilinopyrazolo (3,4d) pyrimidine somewhat delayed virus multiplication as well. Isoguanine altered the cells in such a way as to prevent virus growth. At higher concentrations most of the benzimidazoles seemed to reduce virus concentration in the fluid, but they did not exhibit this effect at lower inhibitory dilutions. 4-Hydroxy-6-nitrobenzimidazole seemed to be virucidal, but considerable virus was detectable by the Dulbecco plaque technique. 2-(1-Hydroxybenzyl)-benzimidazole suppressed virus *in vitro* although three or four plaques were noted when the compound was tested in this manner.



The most consistent agents reversing poliovirus inhibition by the benzimidazoles were adenine and/or guanine, and in two instances the ribotides guanylic acid and adenylic acid. The ribosides guanosine and adenosine did not reverse the inhibitory activity of any of the compounds. Inhibition by two of the quinoxalines was reversed by adenine and the third by guanine; inhibition by all three was reversed by folic acid, indicating that these compounds might possibly be anti-pteridines. Reversal of 1-phenyl-4-anilinopyrazolo (3,4d) pyrimidine over a narrow range was effected by adenine, guanine, and adenosine. Isoguanine inhibition was reversed by guanine.

The relationship between 6-amino-4-methoxy-benzimidazole and adenine probably was competitive. A competitive relationship existed between isoguanine and guanine. Reversal of 1-phenyl-4-anilinopyrazolo (3,4d) pyrimidine by adenine appeared to be competitive, but the range of reversal was narrow.

1-Phenyl-4-anilinopyrazolo (3,4d) pyrimidine caused a delay of twelve days in the appearance of poliovirus in cultures of monkey testicular tissue. 6-Methoxy-4-nitrobenzimidazole delayed appearance of virus and diminished the quantity of virus produced by the cultures. The higher concentration of benzimidazole had a greater suppressant effect than lower concentrations upon the growth of the virus.

A delay of 36 hours in virus multiplication was produced in kidney cultures by the highest concentration of 4-methoxy-6-nitrobenzimidazole, and a delay of 24 hours was evident in the case of the lowest inhibitory concentration. Most of the benzimidazoles suppressed poliovirus multiplication in kidney cultures for at least 24 hours and in testicular cultures for at least 72 hours.

2-(1-Hydroxybenzyl)-benzimidazole was the only purine analogue found to be effective in treating poliovirus-infected mice. Since this compound also was found to be effective against influenza infections of the chorioallantoic tissue cultures, it was decided to compare the inhibition of influenza by 2-(1-hydroxybenzyl)-benzimidazole with a non-purine compound, thiophenyl urea, the only other compound found to influence the course of poliovirus infection of mice. The two compounds were first tested against different concentrations of influenza virus and the inhibitory action of the compounds was found to decrease as the viral dose increased. The compounds were not appreciably virucidal and had no effect on adsorption of the virus. They had no effect on the release of influenza virus from the infected cells.

The therapeutic effect of the compounds was tested by pre-infecting cultures with 100 LD<sub>50</sub> influenza virus and adding the inhibitors at different time intervals. Results indicated that the compounds were still active at later stages of virus production. The rate of influenza multiplication in the tissue cultures and the suppression of this rate of

growth in the presence of the inhibitors was determined. There was inhibition during the eclipse and latent periods, and there still was some suppression, more marked in the case of 2-(1-hydroxybenzyl)-benzimidazole, at later stages.

The two compounds were added to freshly planted monkey kidney cells and the growth of the cultures was compared at approximately twelve hour intervals for a period of five days with the growth in control cultures. Establishment of the monolayers was at a normal rate and after a period of five days healthy monolayers of tissue were present.

Observations were made on the possible location of poliovirus in the living cell, including effects of the benzimidazoles on the virus, and the stage of virus at which multiplication was inhibited, using thin glass slips in monkey kidney cell roller tube cultures and phase contrast microscopy. Cytopathic changes after introduction of poliovirus were compared with normal cells.

Other investigators found that some of this group of benzimidazoles interfered with amphibian embryonic development by disturbing processes of cell division. This same group observed protracted growth lag phases in cultures of *Tetrahymena gelii* and *Escherichia coli*. It was decided therefore to see, if possible, exactly at which cytopathic stage after poliovirus infection of monkey kidney cells 4-methoxy-6-nitrobenzimidazole would be effective. Results showed that the drug suppressed the virus at the beginning of cytopathic stage II.

Sufficient amounts of seven of the purines and related compounds were available for *in vivo* tests with mice. Only 2-(1-hydroxybenzyl)-benzimidazole was active enough to warrant further study. When 10 LD<sub>50</sub> inocula of virus were given, survival of drug treated mice was 79 per cent in comparison with 37 per cent survival of controls. With a mild 0.5 LD<sub>50</sub> virus challenge dose given just prior to the drug diet, 30 per cent of the controls died but the drug seemed to protect all of the mice against this mild infection. Virus inoculations of 100 LD<sub>50</sub> resulted in 70 per cent deaths and 15 per cent paralysis of controls, while 60 per cent of the mice receiving drug died. Thus the degree of protection varied with the dose of virus. When the drug diet was given 48 hours, 24 hours, and 12 hours before intraperitoneal inoculation of 10 LD<sub>50</sub> poliovirus protection was obtained against virus infection, with only an average of 10 per cent of the mice dying from infection by the virus compared with 45 per cent in the control group.

Perhaps the most interesting relation of structure to activity is that 11 of the 12 more active benzimidazoles and all of the quinoxalines were substituted in the positions corresponding to positions 2 and 6 of the purine ring. These positions correspond to those in guanine and

in the effective carcinostatic drug, 2,6-diaminopurine. The other effective benzimidazole was substituted in the 2-position.

In the case of the 26 pyrazolo-(3,4d) pyrimidines tested, the two most active ones were substituted in the 1 and 4 positions whereas only one compound of 12 tested was substituted in the 4 and 6 positions. The latter positions correspond to the 6 and 2 positions of purines.

Positions 5 and 7 were substituted on both of the effective nitroquinoxalines. These positions would correspond to positions 6 and 2 on the purine ring and 4 and 6 in the benzimidazole ring. All three effective quinoxalines had in common methyl groups attached in positions 2 and 3.

In the studies in tissue explant cultures the cells may be less vulnerable to virus penetration and better protected from toxic effects of the drugs. Thus monkey testicular explant cultures required higher concentrations of poliovirus and were more resistant to toxic effects by the purine analogues. The chick chorioallantoic membrane explant cultures were somewhat more sensitive to the toxic effects of the compounds than the monkey testicular explant cultures and less sensitive to virus than the monkey kidney monolayer cultures.

In the virus-tissue culture systems studied, a single sequence of infection is achieved by the use of massive inocula. With poliovirus, there was an initial decrease in titer of culture fluid after which there was a rise in fluid titer which paralleled closely that of the tissue. This effect was not as pronounced with the influenza virus. In a multicellular chorioallantoic membrane culture, the viral growth curve represents a continual release of virus from the culture in which the cells are in one maturation stage or another at different times.

The benzimidazoles suppressed poliovirus multiplication in monkey kidney cultures for about 24 hours. 2-(1-Hydroxybenzyl)-benzimidazole acted mainly to suppress influenza virus growth during the early latent period, although it continued to affect virus multiplication at later stages. In the case of poliovirus-infected kidney cells, 4-methoxy-6-nitrobenzimidazole seemed to suppress the virus at the beginning of cytopathic stage II in which the nuclei were becoming irregular and the cytoplasm was beginning to round up. Perhaps this period is equivalent to the early latent period for influenza virus.

It is interesting to observe to what extent effectiveness in one system is of value in predicting effectiveness in another system. Initially, all the compounds had a therapeutic ratio of eight or more in testicular tissue. Of 18 of these tested further, 14 had a therapeutic ratio of two or more against poliovirus in kidney tissue, and 7 had a ratio of two or more against poliovirus in HeLa cultures. Of 10 compounds effective against poliovirus in testicular tissue 4 had a ratio of four or more against influenza virus in chorioallantoic explants. This is a



much larger proportion of effective compounds than observed by other workers in this laboratory who found 12 compounds of 568 tested effective against influenza virus. It would appear from this that there is a somewhat greater probability than that due to chance alone that a drug effective against a virus in one system also will be effective against the same virus in another system or even against another virus in another system.

So far no compound has been discovered which is uniformly effective in experimental animals previously infected with a true virus. The results with 2-(1-hydroxybenzyl)-benzimidazole and thiophenoyl urea upon the course of poliovirus infection in mice appear promising. Since the compounds were probably at a maximum concentration in the blood some time after the virus was administered and gained foothold, the fact that mortality of mice due to infection was reduced even in the case of such a severe test seems to warrant further investigation of these and similar compounds. Chemoprophylaxis of poliovirus in mice with these two compounds indicated that the compounds could possibly be of use in preventing carrier states or in stopping further development of disease in a community exposed to possible infection.

## THE EFFECTS OF A BACTERIAL POLYSACCHARIDE UPON SOME PHYSIOLOGIC RESPONSES IN THE RAT

by CHARLES ARTHUR TOOMPAS\*

The bacterial polysaccharide (toxin, endotoxin, pyrogen) extracted from *Serratia marcescens* (*Bacillus prodigiosus*) by Dr. M. J. Shear and associates, and designated as "P 25" was tested, by single intraperitoneal doses only, for its physiological effects on gently unanesthetized male albino rats (Osborne Mendel strain). This and similar agents have shown promise in the field of cancer chemotherapy but due to the toxic systemic reactions they cause, have had only limited clinical use. Experimental observations indicate that these agents may also have clinical application in the treatment of hypertension, nerve regeneration, burns, aplastic anemia, and agranulocytosis.

This report includes studies on male rats on the effect of the polysaccharide on body weight, survival rate, rectal temperature, total leukocyte count, hematocrit, adrenal weight, adrenal ascorbic acid, and splenic weight of intact animals; leukocyte count and hematocrit of heparinized rats; systolic blood pressure of intact and splenectomized rats; and leukocyte counts, hematocrit, and systolic blood pressure of splenectomized-adrenalectomized rats.

Busch (1866) reported two cases of sarcoma in which the tumors had shrunk markedly after a spontaneous attack of erysipelas. In 1867 Busch induced erysipelas experimentally in a woman with multiple sarcomas. After the appearance of the erysipelas lesions in this patient, the large tumor shrank about one centimeter per day and some of the smaller tumors were completely resorbed. However, the large tumor subsequently grew rapidly again. Pott reported in 1775 that scrotal cancer of chimney sweeps developed after prolonged contact of abraded skin with chimney soot. Later it was observed that coal tar products are causative agents of skin cancer. In 1882 Fehleisen isolated a streptococcus from erysipelas lesions and reported that this organism, given to a woman with multiple sarcomas of the skin, elicited a typical attack of erysipelas. Moreover, the main tumor mass receded, and some of the smaller tumors regressed completely. In 1892 Roger, in Paris, investigated the effects of *Bacillus prodigiosus* (*Serratia marcescens*) and observed that *B. prodigiosus* or its toxins increase the virulence of other organisms with which they were associated in their proliferating stage. Therefore, Coley (1892) incorporated the toxins of *B. prodigiosus* with those from *Streptococcus erysipellatis* in the formula for

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treating malignant tumors, producing materials known as Coley's toxins. Research by Beebe and Tracy (1907) and later by Schwartzman (1937) has indicated that the toxins of *B. prodigiosus* possess more potent tumor destructive properties than various types of streptococci.

In 1931 Gratia and Linz applied bacterial products on experimental cancer and obtained hemorrhage and liquefaction in transplanted liposarcomas in guinea pigs by administration of filtrates of *B. coli*. In 1936 Shear and Anderson isolated potent concentrates from filtrates of *B. coli* broth cultures, which were capable of producing hemorrhage and necrosis in mouse sarcoma 37. Finally in 1943 Shear and associates isolated the first of a series of tumor-necrotizing polysaccharides from *Serratia marcescens* (*Bacillus prodigiosus*). This polysaccharide, when administered to mice with subcutaneous tumors, produced hemorrhage in the tumors within a few hours. When small doses were progressively increased a tolerance was developed by the animals and simultaneously the tumor tissue appeared to develop a resistance to the hemorrhagic effect. A single large dose produced symptoms resembling those of shock. The mice were prostrated, respiration was labored, diarrhea was not uncommon, muscle tone was decreased, and body temperature dropped.

Physiologic responses attributed to the present polysaccharide "P-25" by previous studies are: (1) fall in blood pressure in anesthetized, cannulated rabbits and dogs; (2) prolonged fall in systolic blood pressure of peripheral (skin) arteries adjacent to transplanted tumors in unanesthetized tumor-bearing mice; (3) doses of "P-25" which were tolerated by intact rabbits were lethal to splenectomized rabbits; (4) initial leukopenia followed by leukocytosis in intact rabbits and albino rats; (5) no change in the erythrocyte count in intact rabbits; (6) pyrogenic response and the production of the local Schwartzman phenomenon in rabbits; (7) pooling of blood in liver, lungs, and spleen of rats; (8) the initial leukopenia was not prevented by splenectomy in rabbits and in rats; (9) tachycardia, hypotension, vasodepressor tachyphylaxis, and increased circulation time in rabbits; (10) no effect in reducing the growth potency of sarcoma cell suspensions *in vitro*.

Forty nine rats were used for tolerance studies, and since fatalities usually occurred within 24 hours after injection, an animal living at the end of five days was considered to have survived.

Twenty rats were used for rectal temperature studies employing a mercury rectal thermometer with a Fahrenheit scale graduated to 0.2 of a degree. The thermometer was lubricated with H-R lubricating jelly and inserted about two centimeters into the rectum for a period of three minutes. Several readings were taken the day before and also before the "P-25" injection, and then hourly readings were taken up to six hours post-injection.



For the collection of blood samples and for rectal temperature determinations the rats were held in an adjustable metal holder which was developed by us. Tail tip blood samples were used for the leukocyte counts and hematocrits. The leukocyte pipettes, hemacytometer, and cover-glass were all certified by the U. S. Bureau of Standards. Each leukocyte count was obtained from a single pipette dilution and two chamber counts or a total of ten large squares. The pipettes containing the diluted blood samples were rotated in a Bryan-Garry pipette rotor for ten minutes or more. Cover-glass blood smears were prepared and stained with Wright's stain to detect the number of nucleated erythrocytes when 200 leukocytes were seen under oil immersion on the microscope. The hematocrits were done according to the micro method of Strumia *et al.*, using double oxalated capillary tubes (ammonium-potassium oxalate) centrifuged for two minutes at 16,500 r. p. m. in a capillary centrifuge and read on a capillary hematocrit reader. Adrenal ascorbic acid was determined on pairs of glands using the method of Roe and Kuether and a Coleman Jr. Spectrophotometer. The adrenal glands and the spleens were weighed on a Roller-Smith precision balance to the nearest 0.1 mg.

Systolic blood pressure studies were done on unanesthetized trained rats by the indirect method of Kersten *et al.*, employing a photoelectric tensometer which permitted a study of blood pressure for several days after the injection of the polysaccharide. The method depends on the use of a sphygmometer cuff around the leg just above the ankle, and the measurement of volume change of the foot by means of the change in volume and intensity of light as measured by a photocell-millimeter arrangement. A series of four to six determinations were taken, and the average was recorded as the systolic blood pressure for that particular time interval.

The experiments conducted were paired before and after experiments, except for those pertaining to adrenal gland weight, splenic weight, and adrenal ascorbic acid where no before and after relationship existed. The data were tabulated and analyzed statistically by the mean difference method.

The maximum tolerable dose of "P-25" on male albino rats was determined to be 5  $\mu\text{g}/\text{gm}$ . When this dose was administered to rats it brought about a significant hypothermia at 1, 2, and 3 hours post-injection and the temperature returned to normal levels on the 6th hour.

The maximum tolerable dose of "P-25" (5  $\mu\text{g}/\text{gm}$ ) induced a statistically significant leukopenia at 1, 2, and 4 hours after injection and a statistically significant leukocytosis at 12 to 24 hours. A 10  $\mu\text{g}/\text{gm}$  dose likewise brought about a leukopenia followed by leukocytosis, and then the leukocyte count returned to normal levels by 48 to 120

hours post-injection, when the observations were terminated. The hematocrit and nucleated erythrocytes showed no significant changes.

Heparinized rats (5 mg/100 gm) treated with "P-25" (10  $\mu$ g/gm) exhibited a milder but still significant leukopenia at 2 hours post-injection without any change in the hematocrit.

Splenectomized-adrenalectomized rats that received polysaccharide in single doses of 1, 2.5, 5, and 10  $\mu$ g/gm all exhibited severe leukopenia 2 hours post-injection and all died within 20 hours. Of three splenectomized-adrenalectomized rats receiving 0.5  $\mu$ g/gm two died within 20 hours and all showed severe leukopenia 2 hours post-injection. Saline control animals for the splenectomized-adrenalectomized experiments as well as sham-operated rats receiving "P-25" or saline exhibited the usual expected responses in the leukocyte count, as indicated earlier.

The maximum tolerable dose of "P-25" (5  $\mu$ g/gm) induced a progressive increase in the weights of both adrenals, at 2.5, 7, 11, and 24 hours post-injection, and the increase became statistically significant at 24 hours. The adrenal weights were still increased at 120 hours.

The adrenal ascorbic acid was decreased at 2.5, 7, and 11 hours, but increased at 24 hours post-injection of "P-25" (5  $\mu$ g/gm).

A small decrease (10 mm Hg) in the systolic blood pressure of ten unanesthetized rats occurred at 1.5 hours post-injection of "P-25" (5  $\mu$ g/gm), whereas a 10  $\mu$ g/gm dose given to twelve rats induced a moderate hypotensive response which was statistically significant at 1 and 72 hours post-injection, and the blood pressure returned to pre-treatment values on the fifth day. Two of the rats died within 15 hours post-injection. A dose of 15  $\mu$ g/gm given to six rats induced a severe drop in the mean values of systolic blood pressure readings reaching low levels at 1.5 and 2 hours post-injection, with statistical significance at 1 hour ( $P < 0.05$ ) and 1.5, 2, and 2.5 hours ( $P < 0.01$ ). **Fifty per cent of the animals died within seven hours.**

The administration of the polysaccharide (10  $\mu$ g/gm) to ten splenectomized rats induced a moderate decrease in the systolic blood pressure at 2 hours post-injection, but on the 3rd hour it returned to pre-injection values and remained there during the observation period of 5 days. Ten sham-splenectomized rats received the same dose of "P-25" (10  $\mu$ g/gm) and showed a moderate decrease in the systolic blood pressure at 1 and 2 hours post-injection but remained normotensive from the 3rd hour up to 120 hours. The average post-operative recovery time of the splenectomized and sham-operated animals before experimentation was 31 days. The splenic weight of intact rats after "P-25" injection (5  $\mu$ g/gm) was decreased during the hypotensive state and increased at 7 and 24 hours post-injection.

Splenectomized-adrenalectomized rats that received single doses of "P-25" ranging from 1 to 10  $\mu$ g/gm showed various degrees of arterial

hypotension (mild to severe) varying directly with the size of the dose and all died within 3 hours after injection. A 0.5  $\mu\text{g/gm}$  dose of "P-25" was given to six splenectomized-adrenalectomized rats and induced a decrease in the systolic blood pressure varying from moderate to severe. Two of the six rats died within 3 hours and four survived the observation period of 5 days. Saline injected control groups of animals in all the blood pressure studies exhibited normal systolic blood pressure fluctuations and all survived the 5-day observation period.

The polysaccharide ("P-25") was observed to act as a kryogen in the rat at 1, 2, and 3 hours post-injection. The observed leukopenia in intact rats after "P-25" injection was less severe in heparinized rats and most severe in splenectomized-adrenalectomized rats.

The severity and duration of the observed arterial hypotension due to "P-25" were directly proportional to the size of the dose. Splenectomized rats exhibited a greater drop in blood pressure than sham-operated rats apparently due to splenic contraction in the sham operated rats indicated by decreased splenic weight. However, splenectomy did not alter the survival rate.

The observed changes in adrenal weight and in adrenal ascorbic acid indicated adrenal response following "P-25" administration. The decreased tolerance of splenectomized-adrenalectomized rats to polysaccharide was attributed to the absence of the adrenal glands.

The initial leukopenia occurred simultaneously with the observed hypothermia and arterial hypotension but appeared to be independent of both. It seemed doubtful that the adrenal glands were the cause of leukopenia following bacterial polysaccharide administration.



# AN IMMUNOLOGICAL COMPARISON OF SOME COLICINES AND BACTERIOPHAGES, WITH A BIOLOGICAL AND PHYSICOCHEMICAL COMPARISON OF THE COLICINES

by ANDREW JOHN VARGOSKO, JR.\*

Colicines are bacterial substances elaborated by certain members of the family *Enterobacteriaceae*, antibiotically active against other members of the family, that have been related functionally to bacteriophage. This study was undertaken to investigate some colicines physicochemically and biologically and to compare them immunologically with the T series of bacteriophage to determine if any antigenic relationship exists.

A synthetic medium at pH 7 was utilized to grow the colicine-elaborating *Escherichia coli*. The relation of aeration and temperature on colicine production was investigated. The appearance of colicine commences only when a sharply defined minimum amount of aeration is furnished. With proper aeration at 37 C colicine production is assured, whereas, with the same amount of aeration at 20-25 C, no colicine is produced in liquid medium.

A striking feature of the study has been the demonstration of environmental conditions which affected the bacterial growth and resulted in a lower concentration of colicine in the medium. It was found that colicine production was dependent upon medium constituents, pH, temperature of incubation, and the length of time the extrabacterial colicine was left in contact with the environment of the whole cell. The writer suggests that the ability to produce colicine is a hereditary property found in many bacteria but that optimal conditions of respiration are required for its realization.

Adsorption and elution methods showed that colicines were either neutral or very weakly ionized, water soluble, proteinaceous substances. Ammonium sulfate and acetone precipitation methods were developed to concentrate the colicines. Only one colicine could be isolated from *E. coli* 534, *E. coli* V and CF1, while 3 colicines could be isolated from *E. coli* 534. The method of differentiation between the colicines was based on spectrum studies of susceptible organisms. The colicines were found to be nondialyzable through cellophane and were heat resistant, i.e., able to withstand 100 C for 15 minutes. Although normally basic they remained active after exposure for a short time to hydrogen and hydroxyl ion concentrations ranging from pH 1.3 to 12. This did not hold true

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when the material was held at 6 C or room temperature for at least 3 days. The colicines have an optimal antibiotic activity in a pH range of 5.5 to 7. Of the 3 fractions of colicine 534, that obtained at 90 per cent acetone is more resistant to destruction by change in pH than those obtained at 70 and 40 per cent acetone. The proteolytic enzymes pepsin, trypsin, and papain inactivated the colicines at different rates while normal body fluids had no effect. Colicines precipitated with 90 per cent acetone are the most resistant generally. Trypsin is the most active enzyme against all the colicines examined.

The determination of intracellular and extracellular colicine was undertaken. Glycine and sonic lysis of bacterial cells showed that intracellular colicine was present at approximately 6 hours but as the culture aged intracellular colicine vanished. The presence of an intracellular enzyme, colicinase, is judged to be responsible for this phenomenon.

Sera were prepared against the colicine producing *E. coli* in rabbits. Cross-agglutination studies with colicine producing *E. coli* strains indicated irregular relationships. It was concluded that antigenic structure is not the common denominator that sets apart an organism as a colicine producer. The sera prepared against the whole cell were tested for their ability to neutralize the biologic activity of phage and colicine. If neutralization occurred, it could be concluded that the bacterial cell possesses points similar in antigenic structure to colicine or phage. Equal amounts of sera prepared against the colicine producing organisms and phages of the T series were incubated together. No reduction in phage titer was observed. The same antibacterial sera in contact with colicines did not affect the antibiotic activity of the colicines. It was concluded that there are no immunological relationships between the colicine producing bacterial cell, its colicine, and the phages of the T series.

It has been shown in this study that a mineral oil emulsion stabilized by lanolin, containing colicine in the aqueous phase, is capable of eliciting an antibody response in rabbits. The immune sera were used in neutralization and complement fixation tests. The writer believes success in obtaining an immunological response with colicines is due in no small measure to the adjuvant. The anticolicine sera neutralized the action of homologous colicine when the colicine was tested against a susceptible substrate organism. Anticolicine sera were mixed with *E. coli* B, the host organism for the T series of phages, and incubated at 37 C, and aliquots were removed from the mixture. A phage suspension was so diluted that the plaque count would fall within a readable range. At appropriate time intervals aliquots of phage were added to equal amounts of serum-treated *E. coli* B, mixed and plated. The titers of phages were read after the plates were incubated at 37 C for 24 hours. No difference between the control phages which were treated

with normal rabbit serum and the test phages treated with anticolicine sera was observed. This indicates that anticolicine serum does not affect the receptor sites of phages. No effect upon the multiplication of *E. coli* B was caused by anticolicine sera. Using anticolicine sera, neutralization tests with the T series of phages were conducted. The colicine antisera did not affect the titers of the T series of phages, indicating that the colicines studied and the T system of phages are not related.

The antiphage sera gave good neutralization results when tested against the homologous phage. When the sera were tested against colicine in a usual neutralization test, the sera did not affect the action of colicine against a suitable substrate organism. This shows that no neutralization antibodies reactive with both the phages and colicines are present. Particular attention was paid to the reactions between T6 phage antiserum and K235 colicine, and T2 antiserum and colicine E, because of the relationships reported by Fredericq.

A complement fixing antigen was shown to be present in small quantities in the colicines. Complement fixation tests using 4 units of amboceptor, one and one-half 50 per cent units of complement, 18 hours of incubation, citrate ion hemolytic inhibitor, and 50 per cent hemolysis as the end point were used to determine if any immunological relationship exists between the colicines, the colicine producing cells, and the T series of phages. In this study no complement fixation with antisera against T1 and T4 was demonstrated, but there was complement fixation between sera prepared against T2, T3, T5, T6, and T7 and their homologous phages.

Colicine antisera did not react in the complement fixation test with the colicine producing bacteria or the T phages. Likewise, colicine antigen did not react with serum prepared against the colicine producing bacteria or against the T phages. Therefore, no immunologic associations are present between the whole organisms producing colicine, the colicine, and the T series of bacteriophages as far as can be demonstrated by the complement fixation test. When complement fixing activity among the colicines was compared, very little cross reaction occurred. This lack of extensive cross-relationships among the colicines illustrates that there are many colicines linked together by a common functional property of bacterial lysis, but sufficiently different in structure not to be grouped together as one substance. Dissimilarities between the phages and colicines give the impression that this is an example of one of the few instances in which a given chemical structure which is functionally similar (lysis) is shared by two otherwise unrelated entities.





SUMMARIES OF DISSERTATIONS  
SUBMITTED FOR  
THE DEGREE OF  
DOCTOR OF JURIDICAL SCIENCE





## COMMON LAW MILITARY OFFENSES

by JAMES KENNETH GAYNOR •

Military law is similar in many respects both in substance and in procedure to nonmilitary criminal law. It has been recognized as a distinct branch of the law since Roman times, and probably earlier. Since May 31, 1951, all of the armed services of the United States have been under the Uniform Code of Military Justice which includes, in its penal provisions, both purely military offenses and nonmilitary offenses.

Most of the punitive articles of the Uniform Code are reasonably definite in defining the conduct which they prohibit. Two of the articles, however, specify only general conduct which is proscribed. Article 133 provides punishment for "conduct unbecoming an officer and a gentleman." Article 134 provides that an offense shall result from "all disorders and neglects to the prejudice of good order and discipline in the armed forces, all conduct of a nature to bring discredit upon the armed forces, and crimes and offenses not capital." The conduct which will result in a violation of either of these articles must be determined by that which sometimes is called the common-law method: a study of the decided cases.

A law found in the Roman *Digest* bears a marked resemblance to that which today is Article 134. Provisions similar to Articles 133 and 134 were included in the British Articles of War of 1765; and like provisions have been a part of American military law since the founding of the republic.

A statute which either forbids or requires the doing of an act in terms so vague that men of common intelligence violates the first essential of its meaning and differ as to its application violates the first essential of due process of law. It has been stated by the Supreme Court of the United States. Although review by nonmilitary courts of convictions by courts martial is limited to the question of jurisdiction, and the number of times that civilian courts have had occasion to pass upon the proceedings of courts-martial is relatively small, the Supreme Court nevertheless thrice during the Nineteenth Century had before it cases involving predecessors of Article 133 and 134. Upon two of the occasions the validity of the provisions was sustained, and upon the third such occasion the validity appears to have been assumed.

Article 134, commonly known as the "general" article, proscribes three types of conduct: (1) disorders or neglects to the prejudice of good order and discipline, (2) conduct of a nature to bring discredit upon the

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armed forces, and (3) crimes or offenses not capital. The *Manual for Courts-Martial* states that disorders and neglects to the prejudice of good order and discipline include only those acts which directly are prejudicial rather than those which are prejudicial only in a remote or indirect sense; that conduct of a nature to bring discredit upon the armed forces is that which injures the reputation of the services; and crimes and offenses not capital are those acts or omissions which are not made punishable by another article of the Uniform Code and which are denounced as crimes or offenses by enactments of Congress and made triable in the federal civilian courts. The Court of Military Appeals has said that Article 134 "is not intended to set up a moral standard for the conduct of an individual's affairs in private—provided, at least, that the conduct does not interfere with the performance of military duties."

The conclusion is apparent that whether conduct is prejudicial to good order and discipline, or is of a nature to bring discredit upon the armed forces, is a question of fact in most cases, although where a military tribunal has held that a certain type of conduct falls within either of these two categories, such precedent may be controlling and almost always will be persuasive.

The starting point for most present-day researchers in the field of military law is the two volume work by the late Colonel William Winthrop, *Military Law and Precedents*, the last edition of which was published in 1896. Citing cases almost from the beginning of the republic, Winthrop listed more than one hundred and twenty five specific acts which had resulted in convictions under the general article. Each edition of the *Manual for Courts-Martial* beginning in 1908, has included a table of maximum punishments listing various offenses violative of the general article. With each of the two principal recodifications of military law during the present century, however, a number of offenses formerly violative of the general article were made punishable by separate specific articles.

Only six offenses violative of Article 134 are discussed in the text of the present *Manual for Courts-Martial*, but the table of maximum punishments lists more than forty types of conduct cognizable by the article. The offenses listed in the table may be separated into four types of derelictions: (1) those which are purely military offenses, or peculiar to the military service; (2) those which are offenses because the person subject to military law is held to a higher standard of conduct than is demanded of a person in civilian life; (3) those acts which would be offenses in civilian life, but which are not cognizable by other punitive articles of the Uniform Code; and (4) acts which are but different aspects, of a lesser degree in most cases, of acts prohibited by other punitive articles.

Among the offenses under Article 134 which are listed in the table of maximum punishments are adultery, bigamy, various types of assault not included within other articles, bribery and graft, the issuance of worthless checks, the dishonorable failure to pay debts, disloyal statements, the use of habit-forming drugs, disorderly conduct, various aspects of intoxication, the use of a false pass, fleeing the scene of an accident, certain types of gambling, negligent homicide, impersonation, various forms of indecency, usury, violations respecting the United States Mail, pandering, parole violations, breaking restrictions, sentinel offenses not included within other articles, the communicating of a threat, unlawful entry, and the wearing of an unauthorized or unclean uniform, to mention a few.

The list of Article 134 offenses in the table of maximum punishments is by no means all inclusive. Of the thousands of reported cases involving the general article, many convictions have been sustained where the particular conduct was not even mentioned in the *Manual for Courts Martial*. Representative cases of a general nature in which convictions have been sustained include the promotion of racial discord, unlawful assembly, the failure to restrain violence by others, certain types of conduct of a treasonable nature, and the giving of unauthorized information during an examination.

There have been a number of cases charged under the general article, however, in which it has been held upon military appellate review that no offenses were alleged. Among such cases have been one in which an individual was charged with the use of a certain drug and it was not shown that it was habit-forming, that of an officer borrowing from an enlisted man where there was no abuse of the officer-enlisted relationship, and the sale of cigarettes to civilians in England where it was not shown that such was violative of any military directive.

The maximum punishment which may be adjudged in the case of an Article 134 violation is prescribed, for many offenses, in the table of maximum punishments. If the offense is not listed in the table and it is closely related to an offense which is listed, the maximum authorized for the latter is applicable. If no closely-related offense is listed, the maximum authorized by the United States Code or the District of Columbia Code is applicable. Finally, if none of these sources provides information upon which the maximum punishment may be determined, the offense may be punished as a simple disorder with maximum punishment of confinement at hard labor for four months and forfeiture of two-thirds of the accused's pay for a like period.

Although it may be debated by members of the civilian bar that the general article is too vague in its terms to provide a reasonable standard of conduct, military men of experience consider it is absolutely necessary that there be such an article. A crime unpunished in the military



service may have a more far-reaching effect than an unpunished crime in the civilian community. It may result in a failure to maintain discipline with a resulting needless sacrifice of many lives in battle. Instead of abolishing the general article or placing fatal limitations upon it, it here is advocated that changes be made which will strengthen discipline and at the same time meet the objections of critics.

As the military law of the United States has developed, offenses from time to time have been removed from cognizance of the general article and have been made the subject of separate punitive articles. It is submitted that more needs to be done along this line, and that almost all of the offenses listed under Article 134 in the table of maximum punishments well could be the subject of separate punitive articles. Furthermore, although it here is reiterated that there is a need for a punitive provision such as the general article, it is recommended that consideration be given to limiting the amount of permissible punishment which may be adjudged in the case of one convicted of prejudicial or discreditable conduct to that which would be adjudged by a special court martial, which is confinement at hard labor for six months and forfeiture of two-thirds of the accused's pay for six months. It then would seem desirable to place the third category of Article 134 offenses—crimes or offenses not capital—in an entirely separate article.

It is suspected by this author that there are many acts which should be punishable under the general article but which are not charged at all because precedent cannot be found for the particular circumstances. It is submitted that apart from crimes or offenses not capital, whether a particular act offends Article 134 is not wholly dependent upon whether it is listed in the table of maximum punishments, or whether a prior conviction for the same act has been sustained, but where the conduct is prejudicial or discreditable to the service. The determination of such should not be viewed as a matter of law but as a question of fact for determination by the court.

Conduct unbecoming an officer and a gentleman, now proscribed by Article 134, always has been a part of the military law of the United States. It was explained in a general order in 1862 that the words imply something more than indecorum, and that a charge of such is not sustained unless the evidence shows the accused to be one with whom his brother officers cannot associate without loss of self respect.

The *Manual for Courts-Martial* gives but eight examples of unbecoming conduct: making a false official statement, dishonorable failure to pay debts, opening and reading the letters of another officer in his presence or about him to other military persons, being grossly drunk and conspicuously disorderly in a public place, public association with notorious prostitutes, committing or attempting to commit a crime involv-

ing moral turpitude, and failing without good cause to support one's family. With the possible exception of public association with notorious prostitutes, all of these acts would be violative of military law if committed by anyone, whether an officer or not.

Many other types of conduct, however, have resulted in convictions under Article 133 of its predecessor. Among the offenses have been various falsifications with respect to official matters, larceny, assault, mistreatment of enlisted men, adultery, various types of improper conduct with relation to members of the opposite sex, and attempting suicide. In fact, the variety of types of conduct cognizable under Article 133 appears to be almost infinite.

There have been few cases of convictions under Article 133 or its predecessor in which military appellate bodies have found that the accused was guilty of no offense whatever, but there have been many cases where it has been held upon appellate review that the accused was guilty only of a lesser offense, a violation of the general article.

Although a multiplication of charges based upon the same set of circumstances is prohibited in military law, the same act may be charged both as a violation of Article 133 and as a violation of some other article of the Uniform Code in separate charges. Prior to the enactment of the Uniform Code of Military Justice, the only authorized punishment for conduct unbecoming an officer and a gentleman was dismissal from the service; with the effective date of the Code, however, it became such punishment "as a court-martial may direct." The punishment now may include confinement at hard labor in addition to dismissal from the service, or it may include only a forfeiture of pay or a reprimand. Therefore, no useful purpose now appears to be served by charging an officer under both Article 133 and another punitive article since such will not result in an increase of punishment.

The purpose of a provision such as Article 133 is to require a higher standard of conduct of officers than of other persons subject to military law. Article of war 95, the predecessor of Article 133, was a potent provision because mandatory dismissal resulted from conviction. It here is submitted that without mandatory dismissal upon conviction, Article 133 is useless. The conduct could be charged under Article 134 and the same result would be achieved. Mandatory dismissal, as the punishment for unbecoming conduct, should be restored. A further recommendation here is made with respect to Article 133. There presently are thousands of civilian employees of the military departments who, serving outside the continental or territorial limits of the United States, are subject to military law. Generally those who receive remuneration corresponding to that of officers are granted many of the privileges of officers. It is urged that those civilians who, in overseas areas, receive the privileges of officers should be held to the same standard of conduct

as are officers, and that Article 133 should be amended to include such civilian employees.

Articles 133 and 134 are unique in comparison with other provisions of Anglo-American law relating to criminal sanctions. Only in military law would such seemingly indefinite prohibitory laws be acceptable. It is a tribute to those persons who, through the years, have administered American military law that practically no evidence of abuse of such provisions has been found, and that upon but a very few occasions have their validity been questioned.

The suggestions here presented for amendment of the general article are not advocated as urgent needs; they instead are presented as ideas for consideration in the logical development of military law. It is Article 133 which it here is urged is in need of early legislative attention. It is submitted that mandatory dismissal from the service for conduct unbecoming an officer and a gentleman is a necessary sanction, and that although the idea of requiring a standard of conduct of civilians subject to military law which is commensurate with the privileges accorded them is new, it is worthy of the full consideration which will be necessary prior to its adoption.

Although changes in both Article 133 and Article 134 here are recommended, it is concluded that such articles and their predecessors have been, through the years, satisfactory in the way in which they have been applied.



## FOREIGNERS UNDER THE LEGAL SYSTEM OF IRAQ

by ZUHAIR ELIAS JWAIDEH\*

### INTRODUCTION

Necessarily the law in Iraq applicable and pertinent to foreigners and their affairs is rooted in the basic legal code of the land. Consequently, a brief consideration of the origins and sources of Iraqi law (and of the geography and history that helped to give that law the sources and the development it has had) ought to be the starting point for the entire subject.

Thanks to the combination of geographical position and historical event that put Iraq in the mainstream of the history of Islam and of the Ottoman Empire, the early important sources of Iraqi law are Muslim law and Ottoman law. Thus Iraq is subjected to the importance of both the Word and the Tradition in Islam (which, of course, often merely codified or modernized for itself the pre-Islamic law and custom of areas that had been long inhabited before the Prophet himself came to bring his revelation to the world), and to the separation of religious from nonreligious law. Thus, also, Iraq comes to inherit through Ottoman law various influences which underlay the latter, including the concepts and often the very nomenclature of French Codes.

In addition, Iraqi law today can be traced to the influence of British occupation law applied in the days following the defeat of the Ottoman Empire in World War I, which was followed at last by the legislation enacted by the State of Iraq itself in the several different stages through which it has passed in recent decades.

What all of this tumultuous history adds up to is that the law in force in Iraq today, showing a diversity of influences, actually includes some Ottoman law (itself strongly influenced by Islam); some law enacted by the occupation authority of more than thirty-five years ago; and Iraqi law itself, enacted before the accession of the king in 1921, or from that date until the opening of the first Parliament, or by Parliament in the modern state.

### JUDICIAL ORGANIZATION

The nature of the organization of the judicial system in Iraq, with its Muslim and Ottoman tradition and heritage, can be confusing to the Westerner who is accustomed to the major classifications of Civil and Criminal courts. In Iraq the distinction between the two major

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classes of courts is a distinction between the Civil and the Religious (or *Shari'a*) Courts— that is, secular matters in general are kept separate from religious matters, and all secular matters, whether we would consider them as criminal or civil issues, are in the purview of the Civil (i.e., secular) Courts. In actuality there is a distinction made between civil and criminal courts; but, both being secular in nature, both are sub-classifications under the Civil Court system.

Perhaps the easiest way to indicate the scope of the varying classifications of courts is to say that, with the exception of those issues declared to be the special province of other courts, all civil, commercial, and criminal matters ultimately fall to one or another of the Civil Courts. The exceptions are these:

1. To the Religious Courts goes jurisdiction over those matters that the *Qur'an* and other sources of religious authority have long kept out of secular hands—matters pertaining to the personal status of Muslims or to the administration of pious foundations, matters of marriage, divorce, separation, alimony, dowry, wills, etc.
2. To the so called Special Courts goes jurisdiction over a few special classifications of matter, notably tribal disputes, certain military offenses, some issues involving government officials and the government itself.
3. To the High Court goes authority over the trial of any government minister or member of Parliament or of any judge of the Court of Cassation for alleged offenses arising in connection with the performance of duties. It also has the sole right to interpret provisions of the Constitution and to examine laws both for their meaning and for their conformity to the Constitution.
4. And to the Special Court of Diwan, convoked only when a minister needs its aid, goes authority to interpret laws and regulations, particularly with regard to public administration, when no question of constitutional validity has arisen.

The Civil Courts referred to above comprise civil and criminal courts of various types, Courts of Appeal which may hear certain civil actions after the lower courts have once passed upon them, and the Court of Cassation, whose civil and criminal branches are respectively the final recourse in all civil and criminal cases. By the nature of the authority vested in the various types of courts it is virtually inevitable that the foreigner who has court business in Iraq will be dealing with one or more of the courts classified as Civil.

#### CIVIL PROCEDURE

The Code of Civil Procedure, though much amended and modernized, has remained the basis of procedure in civil cases in Iraq. Since the origin of this code is the old Ottoman law, Iraqi procedure is, in effect,

still essentially that set down by the French Code of Civil Procedure of 1807. Particularly as it appears in Iraq, the effect of this code may seem to one accustomed to Anglo-American procedure to throw rather more weight on the discretion of men—i.e., the court—and rather less on the law itself. Appeal or cassation is provided for in most cases involving claims of any consequence.

In the Civil Code (not the same as the Code of Civil Procedure mentioned above) appear the pertinent provisions regarding law of evidence. Proof by writing; admission; the tender of an oath; proof by witnesses or by oral testimony; and presumptions—all of these are acceptable, within the limitations set down by the Civil Code, as, for example:

1. That the oath must be sworn on the *Qur'an* or the appropriate holy book of the individual's faith;
2. That a witness must not have any such tie with the person on whose behalf he is offering evidence as would make it unlikely for him to be impartial;
3. That from a woman, as for a person who is ill, either oath or evidence may be taken outside the court; and
4. That any presumption that an earlier case has established a precedent can be valid only if the earlier decision affected the same parties regarding the same issue.

#### CRIMINAL PROCEDURE

Although in many respects modified by subsequent supplemental legislation, the basic law governing criminal procedure in Iraq is the Baghdad Criminal Procedure Regulations, originally promulgated as part of the law of the occupation days and related both to British origins through British military law and the Sudan Penal Code, and to French law through Turkish Criminal Procedure. Thus, for example, the whole system of magistrate-investigators known to French procedure as the *Parquet* moves with modification into Iraqi law with a change of name and with a transfer in status from judiciary to police, but with its essential character and function retained.

The Baghdad Regulations and the Baghdad Penal Code together bring under their jurisdiction foreigners who fall into either of two classes: any who may commit one of the specified criminal offenses within Iraq; and any who may commit outside Iraq any offense against the safety of the Iraqi state, or its stamps, currency, or financial securities, and who may then be arrested within the boundaries of Iraq itself.

The various applicable rules set forth the details of procedure involved in the apprehension of the accused, in the investigation of the case, and in the actual court hearing. It might be of particular interest, however, to note the purport of two of the provisions found in a con-



sideration of the law of evidence. One, has to be considered in conjunction with an explanatory memorandum that requires the courts to be guided in their acceptance of evidence by what the English law of evidence would sanction. The other, relating to appeal procedure, specifically warns those courts to which appeal might be taken not to interfere with a judgment merely on the ground that evidence has been wrongly admitted (or, for that matter, that there has been any technical fault in the conduct of the trial). In other words, despite the caution that the English law of evidence is to serve as a guide, Iraq will not consider a technical irregularity as grounds for upsetting a court decision (as it so often is in the United States), as long as the higher court is satisfied that the decision was itself a justifiable one, the irregularity notwithstanding.

Various safeguards are spelled out, such as a limitation on the period for which an individual can be detained; and the interests of society are also considered in such provisions as those which govern summons, or the denial of bail or bond to a suspect who is considered likely to disappear if let loose. It is interesting to one schooled in Anglo-American justice that appeal or cassation procedures can in Iraq result in revisions unfavorable to the defendant—a sentence, for example, may be increased; and that neither *habeas corpus* nor trial by jury, both normally indispensable concomitants of the United States criminal justice, is known to Iraqi criminal procedure.

#### TREATMENT OF FOREIGNERS: POLITICAL RIGHTS

The legal status of foreigners in Iraq can in a sense be followed through the series of Anglo-Iraqi agreements promulgated in the years from 1922 to 1931. In the first, Britain retained the right to guarantee such protection of foreigners as might seem necessary; in the last, it was made explicit that the standard reached by the Iraqi government and judicial procedure provided assurance enough that foreigners would be granted the treatment to which international usage normally entitles them.

In Iraq, in accordance with universal international custom, political rights—that is, those rights the exercise of which mean participation in the establishment or management of the government—are limited to nationals alone. If, however, only Iraqis can vote or hold office, by the same token only Iraqis are subject to the matching obligations, such as compulsory military service (by way of comparison, in the United States political rights are exercised only by citizens, and the obligation of military duty exists for citizens or for aliens who have declared their intention of retaining American residence). In point of actual fact, Iraq makes the same kind of exceptional arrangement that governments often

do for their safety or convenience: the law permits certain posts to be filled by foreigners in the absence of Iraqis qualified to hold them.

### **TREATMENT OF FOREIGNERS: CIVIL RIGHTS I**

In the somewhat more complicated area of civil rights, international standards generally accord the foreigner a status wherein his privileges and freedoms are established but are kept necessarily subject to the ultimate good of the state concerned. Thus, for example, rules are set up governing the right of a foreigner to enter or to reside in Iraq. These rules grant to him the right of entry and of residence; but they also prescribe the kind of visa or residence book he must carry and the kind of reporting or supervision to which he is subject by the authorities. The rules also set up standards for the refusal of a visa—paupers, criminals, the insane, any who might, if admitted, prove a burden to the state are thus excluded.

Similarly, there is guaranteed to the state the right of expulsion under specified conditions, as well as the right under certain circumstances to extradite criminals wanted in other countries for offenses committed there. The rules also provide exemption for certain groups, like those on diplomatic duty and their families, or the members of military forces stationed in Iraq in accordance with treaty arrangements.

In regard to the rights that are looked upon as constituting personal freedom, foreigners have the same guarantee against illegal arrest, excessive detention, or over-harsh punishment as do citizens. Such freedom is guaranteed by international agreement and is additionally provided for in the Constitution itself. Likewise, freedom of conscience and worship is guaranteed, and this particular freedom has meant that foreign missionaries could establish schools, churches, and hospitals. Freedom of speech and of the press likewise exists, however, the conditions under which a foreigner can own a periodical or newspaper are spelled out in the Press Law of 1933, as a means of safeguarding the state. That the restrictions imposed have that purpose is clear from their nature: the foreigner must have submitted evidence of good conduct, he must not permit his periodical to be used as the mouthpiece of any party, he must have a responsible Iraqi director, his publication must avoid violating the public trust or endangering the public safety in its handling of various delicate and tricky matters. Freedom of education is covered by international agreements that guarantee the right of foreigners to obtain education and to operate their own schools, subject to the rules of public safety and subject also to certain Ministry of Education requirements concerning personnel, texts, and reports. (The right of association and assembly is limited if it has political connotations.)

Various kinds of public services, including medical services and work-

men's compensation, are generally available to foreigners, but in this area reciprocity is usually the basis of the grant of the right.

It is in the practice of a **trade or profession that the foreigner encounters the sharpest limitations on his freedom.** He can do business in Iraq; and, if he is a doctor or dentist, there are virtually no limitations on him **aside from those to which all his national colleagues are subject.** Law, however, is completely closed to him, and so is brokerage. Furthermore, there is a long list of trades and crafts which are closed to the foreign worker. Treaty provisions, however, permit the foreign worker to work on the basis of reciprocity as well as special concessions.

#### TREATMENT OF FOREIGNERS: CIVIL RIGHTS II

##### Property Rights

The right of a foreigner to hold real property in Iraq is limited by various considerations related to the public good, especially with regard to the kinds of property considered immovable. As far as movable property is concerned, the principal restriction is that foreigners can be denied certain securities the possession of which might conflict with national development through giving control over enterprises directly related to such national development. In immovable property, most classes of real property are closed entirely to the foreigner, the exception being that which might be needed for either residence or business.

The right of succession of a foreigner is governed by the principle of reciprocity; that is, a foreigner can be the heir to an Iraqi's property, but only if the foreigner's own state grants the comparable privilege to the Iraqi. Should a foreigner on his death leave property in Iraq, the consul of his state is authorized to administer the estate, provided that a treaty is in force covering such matters as between Iraq and the other state; in the absence of such a treaty, an Iraqi court is empowered to carry out administrative duties.

Although mining involves a species of immovable property, normally denied to the foreigner, the peculiar circumstances involved in the exploitation of a mining claim have caused Iraq to grant the rights of exploration and of exploitation to foreign individuals and concerns on the same basis as they are granted to natives.

Copyright, patent, and trademark rights are all hedged in by necessary limitations; however, as far as their being awarded is concerned, the terms on which they are granted, the periods for which they run, the kinds of protection they provide, and even the circumstances under which they may be cancelled or revoked are no different for the foreigner from what they are for the national. All considerations affecting this particular group of property rights necessarily apply to the juristic person as to the natural person, since it is to be expected that



a business firm is at least as likely as an individual to be the applicant for or the holder of such right.

### CONFLICT OF LAWS

Perhaps in no area is the interest of the foreigner more deeply involved than in that of **Conflict of Laws**; for here by definition every issue becomes pertinent that includes the question of which of two laws is applicable—a situation more than likely to affect any foreigner living or temporarily stopping in or even passing through a land not his own. To deal with cases arising over Conflict of Laws Iraq has its own procedures.

In business matters, the Iraqi courts assume jurisdiction over the contractual obligations if the foreigner is physically in Iraq or if the property concerned is in Iraq or if the contract was made in Iraq; they have authority over juridical persons of foreign origin under any of a number of circumstances which involve the conduct of business in Iraq. And the legal capacity of a foreigner to conduct business which has been completed in good faith by the other participants is held not to be compromised or revoked by the discovery later that he suffered from some kind of incapacity not readily discernible to someone outside.

Marriage conditions for a foreigner are determined by the law of his own land; a marriage between an Iraqi and a non-Iraqi is valid if carried out in accordance with the law of the land where carried out or the laws of the lands of both parties. The effects of the marriage are governed by the law of the husband's land, as all matters involving divorce, separation, children, etc., are governed also by the husband's allegiance; however, the one overriding consideration in all cases is that the Iraqi law alone is applicable in any matter if one of the parties to the marriage is in fact an Iraqi citizen at the time of marriage. In matters of contract, inheritance, etc., the law sets down the method of determining which law is applicable under specific circumstances.

Complex and difficult problems are involved in the execution of foreign judgments, not merely considerations of the status of the property concerned, but also whether the judgment was a valid one under the law of the land wherein it was issued and also whether it is in accord with the law and public policy in Iraq. For this latter reason a judgment elsewhere obtained may be subject to further scrutiny in the courts of Iraq if execution is sought there.

### FOREIGN JURISTIC PERSONS

The juristic person is always of some consequence in the law as it relates to foreigners, for among such persons are the various national states; today the rights of the juristic person are of particular conse-

quence when the total number of such persons has been vastly increased in two directions: by the addition of any number of international bodies, like the United Nations and all its associated agencies; and by the formation of business and industrial corporations that do business or exploit resources in several parts of the world or in some part of the world other than that in which they were organized.

In general, foreign companies which happen to fit the law's definition of firms doing business directly or through an agent in Iraq are subject not to discrimination but to such regulations as will keep the government informed of their status, protect the interests of the public, guarantee that they are not beyond the reach of legal action for criminal or civil cause, etc. Such companies also retain such important property rights belonging to a foreign person as the holding of patent, trademark, and copyright.

Foreign insurance companies are subject to some additional regulations, notably that they must post a substantial sum of money as a guarantee, and that they must not accumulate and then keep idle and uninvested large sums of Iraqi capital.

When it comes to income taxation, to which both the natural and the juridical person are subject, Iraqi law reveals definite favoritism toward the native resident. By definition the resident alien is classed as a "non-resident"; and every non-resident is denied certain allowances granted to citizens, in addition to being taxed at the highest rate allowable under surtax provisions. On other taxes, as on licensing fees, the foreigner fares no worse than the native.

The United Nations and its agencies enjoy the rights granted juristic persons, i.e., they can enter into contracts, own property, be represented in court, etc. The status of the Arab League in Iraq caused some discussion for some time as that of at least a *de facto* juristic person; implementing internal legislation, like that provided for the United Nations, seems to have settled the question.

#### CONCLUSION

Iraq stands, in toto, as a land conscientiously and for the most part successfully seeking to grant to foreigners the fair status called for by international standards. There are gaps, places where the treatment of foreigners is dependent not on the acceptance of international standard but on reciprocity alone, places also where the foreigner finds himself unmistakably discriminated against. But all in all there is much more in the picture that is white than black, and indications are that Iraq intends to continue in the path of progress in this important matter.

# JUDICIAL DETERMINATION OF A PLEA OF INSANITY IN AVOIDANCE OF PENAL RESPONSIBILITY

by DONALD EARLE BILGER\*

## I. SIGNIFICANCE OF THE PROBLEM

Until July 1, 1954, the District of Columbia tested defenses of substantive insanity in criminal cases against the traditional legal standards, the knowledge test being used from the beginning with the impulse test being adopted at a later date. Innovation of a different criterion first began on July 13, 1951, when one Monte W. Durham was charged with committing the crime of housebreaking. Psychiatrically buttressed with a long history of imprisonment and mental commitment, Durham's sole defense at trial was insanity at time of commission. After waiver of jury trial, he was tried by the court. The United States Court of Appeals for the District of Columbia Circuit reversed and remanded Durham's conviction on July 1, 1954, upon the ground that the insanity tests used at trial were inadequate in light of psychiatric advances and could no longer be regarded as exclusive. *Durham v. United States*, 94 U.S. App. D.C. 228, 214 F. 2d 862 (1954). Accordingly, the so-called product test, simply that an accused is not criminally responsible if his unlawful act was the product of a mental disease or mental defect, was adopted. Holding legal explanation to a minimum, the appellate court defined "disease" and "defect" as used in the product test, but refrained from definitive assistance as to "product" or "causal connection".

Almost immediately attackers and defenders of *Durham* were legion. Most vocal, perhaps, among the defending group were psychiatric practitioners, although they stood not alone. A portion of the Bar, the judiciary, and the laity hailed the decision. By and large, however, no specific group was unanimous in its praise or condemnation, with probably the largest group being cosmopolitan in organization and non-committal in attitude.

As a consequence of the liberality displayed in *Durham* is the public faced with an epidemic of acquittals by reason of insanity, an alarming prospect of inadequate judicial protection, or will the New Hampshire-like rule provide sufficient balance between community needs and penal nonresponsibility, blessed or damned as it is, with minimal legal guide posts? Was a newer criterion truly required and, if so, does the

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product test satisfy the need? To reach these and similar questions, this study has been undertaken.

## II. THE OFFENSE AGAINST SOCIETY

The law of crimes has developed from the customs and taboos of preliterate groups in a low civilization period to the current penal code with every modern society having its common law rooted in the ancient community mores. 1 *Bl. Comm.* 68 (1765-1769). In essence, criminal law represents a sustained effort to preserve important social values from serious harm, not arbitrarily, but in accordance with rational methods directed toward achievement of social morality. Hall, *Principles of Criminal Law*, 1 (1947). To some extent, the unwritten law, the *lex non scripta*, is supplemented, abrogated, or superseded by statute in the United States, with no criminal offense being punishable in some jurisdictions except in pursuance of statute.

In every case from the beginning of organized society it is the actual or threatened injury to the public that makes the complained or conduct criminal, whether condemnation is based upon the common law or upon statute, but concepts of punishment have changed drastically. In early criminal history the crime alone determined the penalty. The prevalent modern philosophy of penology, however, advocates that punishment fit the offender, not merely the crime, a concept bringing individualism to punishment. Predicated upon this broad foundation, various theories of punishment have received general recognition, among which some seven achieved prominence. Dangel, *Criminal Law*, 6 (1951). Most frequently relied upon in practice, however, is the absolute theory which combines most of the other concepts, acknowledging that punishment is retributive justice and recognizing that reformation of the offender and prevention of further crime are considerations. The theory rests upon the assumption that crime as such must be punished. *punitur quia peccatum est*, not because penal discipline is expedient but because it is right. Wharton, *Criminal Law*, 11 (1932).

Accepting the definition that a crime is the voluntary commission or omission of any act which the law forbids or commands under pain of punishment imposed by the state in its own name, Anglo-American jurisprudence recognizes as a general rule the existence of two component parts to each criminal deviation. There must be an overt, voluntary act, accompanied by a mental element known as "intent". *Dean v. United States*, 341 U.S. 494 (1951). Only in the case of legislative enactment so framed as to make an act or omission criminal whether or not there has been any intention to violate the law does the principle that a wrongful act and a wrongful intent must concur break down. Miller, *Criminal Law*, 72 (1934).

While it is generally agreed that there must be a criminal act, yet what constitutes such an act is at times a close question. To be criminal, an act must be so connected with the intended crime that it either wholly or in part causes or tends to cause the crime, the required causal relationship being established even though other independent forces also contributed. The physical element of crime, as contrasted to the mental element or intent, is not confined to external behavior, but may, for example, be inaction. Omission to perform a legal duty is equivalent to an act, though it must be distinguished in each instance from mere passivity, that is, inactivity without a legal duty to act. To constitute a criminal omission there must be a personal duty imposed by the public to perform some act for the benefit of another, a breach of that duty, resultant harm to another or to the public at large, and a causal relationship between the nonteachance and the injury. Dangel, *Criminal Law*, 57, 58 *supra*. Exceptions to the general requirements, however, do exist. Conspiracy, for example, is complete by the mere making of an agreement, though some consider the agreement itself an overt act; solicitation by seeking to persuade another; and in some jurisdictions mere possession of burglar's tools or counterfeit coin is statutorily punishable if the mental requirement is present. Clark, *Summary of American Law*, 118 (1949). At any rate, it would appear that the maxim requiring both an act and a criminal intent in order to constitute a crime is not literally true. It is probably more correct to say that to constitute a crime there must be either an act or an omission to act and a concurring intent, or negligence, or some other recognized substitute for intent, except in cases in which, under the terms of the applicable statute, no intent is required.

The term *mens rea* occurs in the old maxim *actus non est reus, nisi mens sit rea*, meaning "the guilty mind". Its existence depends upon *scienter*, and its presence is required in every common law crime as well as in every statutory crime except those classified as *mala prohibita*. Dangel, *Criminal Law*, 68, *supra*. General agreement as to the meaning of *mens rea* is lacking, but it is agreed that it cannot exist independently of the criminal act and is not always the same. In arson, for example, it means intent to burn; in murder, malice aforethought; in criminal negligence, gross or wanton carelessness; and in forgery, intent to defraud. In point of fact, perhaps the most apt definition of the term would be the mental element of a crime, which varies in accordance with the nature of the crime. The only means of acquiring full comprehension of the expression as applied, of course, is by detailed examination of specific definitions of particular crimes, *mens rea* alone being meaningless. Stephen, *A History of the Criminal Law of England*, 94-97 (1883), and Sayre, *Mens Rea*, 45 Harv.L.Rev. 974 (1932). Motive *per se*, though perhaps an inducement or an incentive to ac-

compish an ultimate purpose, is not an essential element for commission of a crime, and is not capable of making an illegal act legal nor a legal act unlawful. *United States v. Smith*, 4 Cranch (D.C.) 727 (1836); *Cleveland v. United States*, 329 U.S. 14 (1946).

As a general rule, any person possessing the mental capacity required by law who voluntarily commits a criminal act is responsible and subject to punishment for it. The law assumes capacity to comply with the standards of acceptable conduct, except in certain exempted classes, and renders liable to punishment those who do not conform. Holmes, *The Common Law*, 50, 51 (1938). It is, however, a well settled rule that mere ignorance or mistake of law, without more, furnishes no exemption from penal responsibility, though a mistake of fact, if reasonable and *bona fide*, stands on the same footing as absence of the reasoning faculty, as in insanity, or perversion of that faculty, as in insanity. See Keedy, *Ignorance and Mistake in the Criminal Law*, 22 *Harv.L.Rev.* 75 (1908). In essence, the basic tenet of criminal law in Anglo-American jurisprudence has remained unaltered through the centuries; i.e., in order to hold one legally liable for an act committed in violation of the law, it is necessary that the violator had, at the time of commission, sufficient mental capacity to entertain the requisite criminal intent. *Fisher v. United States*, 328 U.S. 463 (1946).

### III. THE PLEA OF INSANITY

Insanity in the legal sense covers nothing more than the relationship between the person and the particular act which is the subject of judicial investigation, resolving itself into the issue of whether mental capacity and moral freedom to do or abstain from doing the complained of act was present. *United States v. Faulkner*, 35 F. 730 (N. D. Tex. 1888). Though it has long been recognized that in certain cases an offender, by reason of circumstances beyond his control, was incapable of exercising sound judgment or resisting an impulse to commit an act considered criminal, it is not every kind and degree of mental disturbance that is sufficient to excuse from penal responsibility. *People v. Perry*, 14 Cal. 2d 387, 94 P. 2d 559 (1939). The mental derangement must be such that the subject is unable to entertain a criminal intent, or incapable of so controlling his will as to avoid doing the act in question. *Davis v. United States*, 165 U.S. 373 (1897).

Substantive insanity raised as a bar to punishment, insanity present at time of commission of the crime as opposed to insanity present only at some post-crime period theoretically sufficient only to postpone trial or delay execution of punishment, was dealt with in *Durham, supra*, and is of primary concern here. It entirely absolves from criminal retribution, whereas subsequent insanity merely postpones an accounting until sanity



is restored. Raisable as a defense at various preliminary stages, substantive insanity usually is placed in issue at trial, and the several states vary considerably in treatment of the plea.

In all jurisdictions trial begins with a presumption that the accused is, and at the time of commission was, of sane mind. *Davis v. United States*, 160 U.S. 469 (1895). As to the strength of the presumption, the courts differ sharply, but in the District of Columbia the doctrine that insanity is an affirmative defense which the accused must establish has been repudiated. In this jurisdiction, once sanity has been put in issue by some evidence, the prosecution bears the burden of proving sanity beyond a reasonable doubt, just as it does with every other essential element of the offense. *Tatum v. United States*, 88 U.S. App. D.C. 386, 190 F. 2d 612 (1951); *Wright v. United States*, 94 U.S. App. D.C. 307, 215 F. 2d 498 (1954).

In no instance in any jurisdiction where any accused is acquitted upon the ground of mental irresponsibility is he simply set at liberty, but the states vary considerably in statutory provisions. *Weihofer, Mental Disorder as a Criminal Defense*, 360, 367 (1954). The District of Columbia now provides for mandatory commitment after such a verdict until sanity has been recovered and the patient will not in the reasonable future be dangerous to himself or others. 24-301 *District of Columbia Code*, 1951 Edition, as amended August 9, 1955. Procedures for release from mental institutions likewise vary from state to state. Before amendment, the District of Columbia Code contained no provision for release after recovery in such circumstances: the defendant had to prove that he had recovered his sanity and was no longer a menace to society. *Orencia v. Overholser*, 82 U.S. App. D.C. 285, 163 F. 2d 763 (1947). As a matter of practice, discharge was securable either by a certificate of restoration to sanity by the superintendent of the mental hospital involved or by a judicial determination of sanity upon a writ of habeas corpus. Currently, however, the Code provides for unconditional release only after hospital certification and a court order, with provision for hearing before the court on its own motion or upon motion of the prosecuting office to which notice of pending release must be given. Conditional release to a responsible person with possible court imposed conditions is also incorporated within the legislative change and is an entirely new feature for this jurisdiction. 24-301, *District of Columbia Code*, *supra*.

#### IV. THE EXPERT WITNESS

The so-called "expert witness", one who by training and/or experience is qualified to offer opinion evidence upon subjects normally outside the experience level of the ordinary man, frequently plays a decisive role in criminal trials wherein the substantive defense of insanity is in issue. By

statute, in most states, information acquired concerning his patient by a physician acting in a professional capacity is privileged, and such a situation existed within the District of Columbia with respect to psychiatric testimony until amendment in 1955. *Sher v. DeHaven*, 91 U.S. App. D.C. 257, 199 F. 2d 777 (1952); *Taylor v. United States*, 95 U.S. App. D.C. 373, 222 F. 2d 398 (1955). The statute has now been altered to provide that the privilege shall not apply to evidence relating to mental competency or sanity in criminal trials wherein the defense is insanity. 14-308, *District of Columbia Code*, 1951 Edition, as amended August 9, 1955.

By and large, practicing criminal lawyers and forensic psychiatrists who testify in criminal proceedings have not always seen eye to eye with respect to terminology and the value of psychiatric opinion. Psychiatrists as a body are harsh critics of evidentiary rules, which occasionally permit effective discrediting, via the testing process, of medical opinion and the traditional insanity standards. Certainly there is an apparent lack of a common language between the professions in a field wherein they sometimes share a mutual interest—the criminal trial. Some fault is traceable to the medical practitioner, because of his usually unwarranted insistence upon the use of esoteric nomenclature in an atmosphere which is not tolerant of elaborate use of technical phraseology and to an audience incapable of understanding such semantics. Niceties of distinction and scientific precision are normally not so important as to negate the requirement of jury comprehension, and a fetish for exactitude results inevitably in delay and a muddying of the never too clear waters. Nor do many attorneys condone medical impatience with legal terms such as "insanity". See Zilboorg, Gregory, *The Psychology of the Criminal Act and Punishment*, 125 (1954).

On the other hand, the legal profession at times appears to regard psychiatry as a medical fad, many attorneys holding the view that psychiatrists fail to agree among themselves even as to basic tenets, and that one can always be found to render a professional opinion in support of counsel's position, regardless of the particular stand legally assumed. Naturally, a corresponding resentment is prevalent among psychiatrists, particularly those who do not conform to these notions. As a general rule, the psychiatrist who is called upon to offer his medical opinion from the witness stand feels that he is, in fact, an expert, and that his knowledge would be infinitely more valuable to the jury if he were not bedeviled by questions from skilled advocates during cross-examination. He considers himself best equipped to understand the medical problems involved and is impatient with evidentiary rules and practices which, in his lay view, either seal his mouth or distort his diagnosis. He has little regard for legal terms which he believes to be inaccurate and antiquated. In short, occasionally, the psychiatrist feels that he and his profession are

ignored or disparged by the law and lawyers to the detriment of the patient, the community, psychiatry, and the psychiatrist. He wants recognition, and he feels that under current court practices he is not getting it.

*Durham, supra*, represents an attempt (*inter alia*), to achieve a truce in this hostility by holding forth as a legal commitment limited definitive phraseology acceptable, by and large, to the medical practitioner. It is not, however, nor does it purport to be, a resolution of this phase of criminal insanity difficulties.

#### V. PSYCHIATRIC CONCEPTS OF MENTAL INCAPACITY

Failures in an individual's socioadaptive capacity are lumped together by the laity into one chaotic, amorphous mass. This is, of course, medically inaccurate, psychiatric clinical entities theoretically being as discrete as the cardiac or the pulmonary disorders. Guttmacher and Weihofen, *Psychiatry and the Law*, 27 (1952). General recognition among psychiatric practitioners has been extended to the following classifications, though they are neither exclusive nor exhaustive: congenital intellectual deficiencies, psychoses, psychoneuroses, psychopathic personalities, and organic brain disorders.

Congenital intellectual deficiency simply refers to failure of the brain to develop for one or several reasons. From birth, sufferers show evidence of inferior intellectual capacity or ability, frequently being characterized as "feeble-minded."

A major group of mental disturbances is classified as the psychoses, roughly but not accurately synonymous with the insanities, in which the disorder is to a large extent physically determined. Manic-depressives experience a fixation of mood in which external events have little or no effect, the external happening being interpreted in light of the current mood. A manic-depressive may be abnormally optimistic, impulsive, irritable, boastful, and rebellious; or he is sometimes a picture of abject pessimism, the past, present, and future holding nothing whatever for him. The schizophrenic suffers, on the other hand, from an illness characterized by bizarre thought content, seeming detachment from the realities, and the presence of delusions. He thinks and acts in symbols, seeing himself, for example, as Napoleon or as Jesus.

Psychoneuroses, or neuroses, characterize an illness involving only a partial change in the entire personality, unlike the psychoses. The world appears to the psychoneurotic essentially as it does to others. His judgment is not fundamentally affected and he is fully aware of his disease, although he frequently ascribes it to some physical ailment. Rarely hospitalized, the psychoneurotic gets along somehow, though handicapped and only in rare instances does he escape criminal responsibility for his conduct because of his illness.



The classification of psychopathic, more modernly termed sociopathic, personality has been referred to as the "waste basket" of psychiatry. The term comprises that group of individuals who are generally without complaints, who do not exhibit abnormally pronounced mood disturbances nor thought distortions which become so manifest as to be labeled delusions or hallucinations, and who are not intellectually deficient. Yet they are constantly in difficulty because of their inability to conform to recognized social norms. The psychopathic personality, being unable to assess a given situation from another's point of view, is frequently anti-social and demands immediate gratification of his desires at the expense of longer-term advantages.

Organic brain disorders involve structural changes in the brain. Illustratively, the classification includes deterioration caused by advanced age, brain infections or inflammations such as encephalitis, and trauma.

#### VI. LEGAL TESTS OF MENTAL INCAPACITY

Not until the early part of the seventeenth century did legal tests of insanity begin to evolve as an aid to determining the kind and degree of insanity that would be sufficient to excuse from criminal responsibility, though insanity had become a defense to crime in England during the beginning of the fourteenth century. Among the early tests was that of the "wild beast", attributed to *Arnold's Case*, 16 How. St. Tr. 695 (1724), with ability to count twenty pence and understanding comparable to that of an ordinary child of fourteen years are set forth in Hale, 1 P.C. 29, 30 (1847). In 1843 the knowledge or right wrong test was handed down by the fifteen judges of England as a result of *McNaghten's Case*, 10 Clark & Fin. 200. The rule therein announced has not been since relaxed nor departed from in English and Canadian law, though in practice English trial judges have occasionally charged that the accused was not to be held responsible if he was unable to control his actions. See Keedy, *Irresistible Impulse as a Defense in the Criminal Law*, 100 U. Pa. L. Rev. 956 (1952). And in the United States at least twenty-nine states adhere to the knowledge test exclusively with the remainder, excepting New Hampshire and perhaps Rhode Island, supplementing it with the impulse test. The federal courts with a single exception also utilize both traditional tests. Of all the American jurisdictions, only the District of Columbia has chosen to stand beside New Hampshire in its use of the product test.

Since *McNaghten*, no court has required greater evidence of insanity than there laid down to prove the accused was insane. A large minority of American states, however, hold that the knowledge test is insufficient standing alone, the theory being that one who knew he was committing an act morally and legally wrong but nevertheless, could not resist the

impulse to commit it should not be held criminally responsible. Accordingly, the fundamental proposition that freedom of will is essential to criminal responsibility was simply applied to the specific case wherein lack of a free will, other than lack of knowledge, is the result of mental disturbance. The doctrine is peculiarly American in origin, the first recorded case in which the power to choose between forbearance or performance was held necessary for punishment being *State v. Thompson*, Wright's Ohio Rep. 617 (1834). In 1895 the Supreme Court of the United States approved an impulse test instruction in *Davis v. United States*, 160 U.S. 469, and in *Smith v. United States*, 59 App. D.C. 144, 36 F. 2d 548 (1929), the test was adopted in the District of Columbia.

Since 1869, *State v. Pike*, 40 N. H. 369, New Hampshire has stood in uninterrupted isolation in its adherence to the theory that in each case the jury should simply be told that if the accused was suffering at time of criminal commission from mental disease and that the criminal act was the product of such disease, acquittal should be forthcoming. Notwithstanding, the tenet of ability to adhere to the right is fundamental; *i.e.*, was the accused able to determine the right and, if so, to follow it? Essentially, the New Hampshire Supreme Court in *State v. Jones*, 50 N. H. 369 (1871), so ruled in finding the ultimate question wherein the defense of insanity was raised to be whether or not at the time of the act the accused entertained a criminal intent.

Until July 1, 1954, birth date of *Durham*, *supra*, the District of Columbia used only the knowledge and impulse tests, the former being law from the beginning. See *United States v. Guitau*, 12 D.C. Sup. Ct. (1 Mackey 498 (1882)). In *Durham*, *supra*, use of the traditional tests as exclusive jury criteria was denounced as inadequate, the court promulgating the rule that an accused is not criminally responsible if his unlawful act was the product of mental disease or defect.

## VII. THE PRODUCT TEST—A CRITIQUE AND PROGNOSIS

*Durham* stands as a monument to forensic psychiatry, a tribute essentially to medical, rather than legal, views. Though the vast majority of American jurisdictions find no lack of insanity coverage as rendered by the traditional tests, the appellate court in the District of Columbia found apparently hitherto undiscerned coverage inadequacies in the older tests, thus making room in the field for the all encompassing product criterion. It did not, however, completely relegate the knowledge and impulse tests to the limbo of discarded legal theories, retaining both for supplemental use wherein an evidentiary base warrants.

According to the court, the knowledge test was only a symptom, not a complete test of insanity. Medically, the statement appears accurate since a symptom definitively is but a subjective manifestation of disease

not necessarily requiring a conclusion that a disease exists. But to the jury such was not the case. Acceptance of medical testimony by that body to the effect that the accused did not at time of commission know the difference between right and wrong dictated, as a practical matter, a verdict of not guilty by reason of insanity. It would seem, however, that if, in fact, a given individual is unable to distinguish between right and wrong by reason of mental disorder, *a fortiori*, he is unable to adhere to the right. Medical symptom or not, he is not criminally responsible. Legally, then, classification of the knowledge test as but a symptom achieves a semblance of psychiatric accuracy, but belies legal practicality.

In finding critical fault with the impulse test the court found a failure to encompass the brooding, reflective characteristics of mental illness, a concept which narrowed its scope to relative uselessness. Though the term "impulse" may be semantically misleading, empirically it has been interpreted to include brooding and reflections present. Again an eagerness to adjust traditional terminology for semantical accuracy created a shrinkage in scope, resulting in a judicially devised need. In filling the gap, the court looked to New Hampshire, a state which had stood alone in its insanity concept for some eighty-four years. Unlike New Hampshire, however, the District of Columbia retained limited use of the older tests.

In essence, though the ultimate question for jury resolution currently is couched in terms of causal connection between mental disease or defect and the criminal act, this jurisdiction has a three-way test. Should a psychiatrist be willing to testify in terms of the traditional tests, a situation by no means rare in post-Durham history though psychiatrists as a body were most vociferous in their complaints about such testimony, instructions utilizing the older criteria are in order. *Douglas v. United States*, No. 12795 (C.C.A. D.C. November 9, 1956). But, in any event, the concept of causal connection which is so conspicuously present in the product test is not unique, since it also exists in the knowledge and impulse tests. Inherently, the causative factor was present in every case. This being true, wherein lies *Durham's* advantage other than in removing an artificially created bareness in a theretofore fully covered area?

Reputedly *Durham's* strength lies in the absence of expressed legal standards in the product area. Therein also lies a weakness. After resolving of the first phase of *Durham's* test (the presence or absence at time of commission of mental disease or defect) and assuming that such mental disorder was found to have existed, the jury reaches the product phase. Should the now-limited knowledge, with its yardstick of ability to distinguish right from wrong, and impulse, with its standard of inability to resist, tests be evidentially inapplicable, the problem becomes increasingly acute. Since compartmentalization of mental activity has been psychiatrically discredited and since the current medical view



sees freedom of will as only a matter of degree, the total personality of an accused who suffered at time of commission from a mental disorder but who falls without the scope of the older tests surely has been affected to some degree by his illness. To carry such a theory to its ultimate, as is permissible, under the bare words of *Durham*, would result in the completely unacceptable result of punishment to none. Nevertheless, the post *Durham* jury in its now legally unrestrained exercise of moral judgment can substantiate promiscuous acquittals by reason of insanity. The need for some legal guide in this perplexing and frequently distasteful and morally difficult field seems apparent. See *Carter v. United States*, No. 13222 (C.C.A. D.C.) and *Bradley v. United States*, No. 13431 (C.C.A. D.C.) (two post *Durham* decisions in which this issue is raised upon appeal, though in neither case has an opinion yet been rendered).

Assuming *arguendo* that expressed and definite assistance is needed to measure causal connectives, rigidity of measurement appears inconsistent with the deliberate liberality of *Durham*. But, on the other hand, the law is utilitarian. Community needs must be safeguarded against unreasoning emotionalism or ignorance resulting in justice only for the accused and none for the accuser. A realistic and feasible guide in keeping with the spirit and scope of *Durham* is required. It is submitted that in order to evade penal responsibility by reason of insanity, the law should require that the criminal act resulted from or was produced by unsoundness of mind, not in a minor or nominal way but in the sense of being in direct relation to and the consequence of the diseased or defective mental condition. See Appendix I for suggested charge. Such an instruction withdraws from jury consideration essentially frivolous attempts to erect a substantive insanity barrier to punishment but permits considerable discretion in the exercise of jury judgment. Trivia is taken from the jury as a matter of law. Although it can be argued that the prosecution's burden of proof is thereby decreased, the withdrawn area never was intended to be factually considered. To hold otherwise belies the practicality inherent in any insanity test.

Post *Durham* history reveals few significant procedural changes, perhaps the most important of which is additional discretionary area placed within the trial court's purview. Should some evidence be introduced relating to the older insanity tests, the court must decide whether or not to include instructions dealing with the traditional tests. Manifestly, of course, the expert medical witness enjoys increased freedom in his testimony, and the advocate must couch his questions ultimately in terms of the mental disease or defect and product requirement. No marked increase either in the ratio of substantive insanity pleas to criminal trials or in the ratio of convictions in cases wherein an issue of substantive insanity is raised to acquittals by reason of insanity has been noted since July 1, 1954.

The likelihood of adoption by sister jurisdictions of the insanity concepts promulgated in *Durham* is remote. For almost a century *State v. Pike*, *supra*, proved nonpersuasive, and a corresponding rejection of *Durham* has already occurred in those states wherein the problem has arisen. Maryland, Montana, California, and Indiana have affirmatively refused to adhere to the views expressed in *Durham*, and at least two federal circuits and the United States Court of Military Appeals have also rejected it. *Thomas v. State*, 206 Md. 575, 112 A. 2d 913 (1955); *State v. Kitchens*, 286 P. 2d 1079 (Mont. 1955); *People v. Ryan*, 140 Cal. 2d 412, 295 P. 2d 496 (1956); *Flowers v. State*, 25 Law Week 2283 (Ind. 1956); *Howard v. United States*, 232 F. 2d 274 (5th Cir. 1956); *Andersen v. United States*, 237 F. 2d 118 (9th Cir. 1956); *United States v. Kunak*, 5 COMA 346 (1954); and *United States v. Smith*, 5 COMA 314 (1954).

#### CONCLUSION

Though the prognosis for relaxation of relative rigidity in traditional insanity tests as exclusively used in foreign jurisdictions is dismal, the concept established in the District of Columbia by *Durham* is medically sound. Enthusiastically hailed by the majority of forensic psychiatrists as at least partial recognition of current psychiatric theory within a more realistic legal framework, most jurists are as yet unwilling to delimit the wide insanity range inherent within the older tests. Indeed, it is difficult to determine wherein *Durham* increases insanity coverage over the older tests properly interpreted. Yet, since *Durham* did materially alter the effectiveness of the knowledge and impulse tests as prospectively applied in the District of Columbia, the product test is also legally sound with respect to filling the created gap in total insanity coverage.

The product test pronounced in *Durham*, though acceptable both medically and legally under the circumstances, invites witness generality and jury speculation by lack of a nonrigid though relatively concrete standard. Until causal connection, expressly required to be found under the product test, is judicially explained and properly delimited as a factual question, society is forced to rely upon the uncontrolled exercise of a jury's moral judgment in an area which should, as a matter of law, fall outside determination of factual issues. Since acquittals by reason of insanity obviously are not reviewable regardless of an apparent lack of reasonable foundation, the public inevitably suffers. Until such time as judicial expression concerning this issue is forthcoming, the matter rests to an undue degree within the discretion of the jury.

# PROBLEMS RELATING TO A FEDERAL CONSTITUTIONAL CONVENTION

by CYRIL FRANCIS BRICKFIELD\*

## INTRODUCTION

The Constitution of the United States provides for its own amendment. It reads:

### Article V

The Congress, whenever two thirds of both Houses shall deem it necessary, shall propose Amendments to this Constitution, or, on the Application of the Legislatures of two thirds of the several States, shall call a Convention for proposing Amendments, which, in either case, shall be valid to all Intents and Purposes, as Part of this Constitution, when ratified by two thirds of three fourths of the several States or by Conventions in three fourths thereof, or the ratification of the States in four thirds of the whole. Provided that no Amendment which may be made prior to the Year One thousand eight hundred and eight shall in any Manner affect the first and fourth Clauses in the Ninth Section of the first Article. And that no State without its Consent shall be deprived of its equal Suffrage in the Senate.

As can be noted, Article V provides two methods for amending the Constitution (1) Congress itself may propose amendments for ratification by three fourths of the states or (2) on application of the legislatures of two thirds of the states, Congress must call a constitutional convention for proposing amendments.

Twenty-seven proposed amendments have been referred to the states for ratification under the first method,<sup>1</sup> but there has never been any use of the second method. Because of the growing number of petitions submitted to Congress by the several states during recent years calling for a convention under the second method, and because of the complex issues involved, the question of when and how Congress must call a federal convention creates considerable problems which should be faced and solved by responsible government officials.

Article V is silent on this question, and little aid can be obtained from the Constitutional Convention of 1787 which raised these issues, but left them unanswered.<sup>2</sup> In addition, court decisions furnish little more than signpost assistance.<sup>3</sup> They have relegated the matter of constitutional amendment to that area of constitutional law known as "political questions". While this circumstance leads one to believe that Congress alone

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may control the matter, there is none the less little guidance for it in determining how and for what purposes constitutional conventions may be convened.

Article V, for example, while providing that the states may make application to Congress for the calling of a convention, sets no requirements concerning what a state application must contain or what standards it must meet in order to be considered as validly made. Several applications, by state legislatures, for instance, were vetoed by their governors.<sup>4</sup> This raises the question of whether the Constitution contemplates action solely by the houses of a state legislature or whether applications must be processed in accordance with procedures for enacting state laws which usually includes action by the state's chief executive.

Another question is: when have two-thirds of the legislatures made application for the calling of a convention? Some petitions to Congress were made one hundred and sixty-eight years ago.<sup>5</sup> Do these petitions and others remain permanently alive, or do they lapse after a reasonable period of time?

Article V is also silent on the subject matter of petitions which may be considered by conventions, as well as on whether states, once having made application, may later rescind their actions.

Other important questions are whether, after the requisite number of petitions have been submitted, an unwilling Congress could be required to call a convention and, if called, whether it could control a convention with regard to its procedures and the scope of its deliberations. The latter issue is further complicated with respect to the extent to which the states themselves may influence and control the actions of a convention.

These problems and others are discussed at length in the thesis. This summary outlines some of the important questions involved and suggests means to dispose of them. It might be stated preliminarily that none of the issues can be resolved or otherwise rendered academic by the Congress through the adoption of federal statutes setting up guides and standards to govern (1) the submission of state applications, and (2) the procedures of constitutional conventions.

#### STATE APPLICATION PROCEDURE

Article V states that Congress shall call a convention on the application of the "Legislatures of two-thirds of the several States" but does not indicate whether the term "legislature" means the usual channels for statutory enactments, including the assent of the governors.

The term "legislature" in different circumstances does not always imply as noted in *Snyder v. Holtz*, the performance of the same function.<sup>6</sup> Ordinarily, the legislature acts as the law making body in each state

government. Under the federal Constitution, it performs additional duties. It was intended to act, for example, (1) as an electoral body under Article I, section 3, in the choice of United States senators; (2) as a ratifying body, under Article V, with respect to proposed amendments; and (3) as a consenting body with regard to the acquisition of land by the Federal Government under Article I, section 8. Wherever, therefore, the term "legislature" is used in the Constitution, it is necessary to consider the nature of the particular action in view.

In so far as the amending process is concerned the Supreme Court has unequivocally stated that state legislatures are performing a federal function—clearly different from state law making.<sup>7</sup> In the light of such a holding, it follows that gubernatorial assent, while pertinent to state lawmaking, is, much like presidential action with regard to proposed amendments initiated by Congress, unnecessary in the federal amending process. Furthermore, the Constitution speaks as of the time it was adopted,<sup>8</sup> and in the beginning very few of the original states granted the veto power to their governors.<sup>9</sup>

As further indication that gubernatorial action was not intended, the Constitution uses both the term "executives" and the term "legislatures" in its text. If the framers of the Constitution had intended that "legislature" include gubernatorial action, they could have used the word "state" which could include the governor, or some other expression such as "the legislature with the approval of the executive". Both terms are in no way novel and both are used in other provisions of the Constitution.

Another issue pertaining to state applications is whether Congress may regulate state procedure in proposing constitutional amendments. As noted above, the amending power is manifestly a federal function in which the states take part in proposing conventions and ratifying amendments.<sup>10</sup> At the same time, however, state legislatures are not subject to absolute Congressional control. A clear distinction must be made between acts which are necessary and proper for Congress to carry out constitutional requirements, and those which seek to restrict the free will of state legislatures. Manifestly, Congress may not dictate to the states what they may or may not suggest in proposing a constitutional convention or when they may propose it.

The Constitution was framed against a background of existing colonial laws, customs, and legislatures. When the founding fathers wrote the Constitution they made provision for those laws and customs and they recognized state legislatures as bodies in being. Cooley, in his book on *Constitutional Limitations*,<sup>11</sup> points out that when a constitution is adopted, there are in existence at the time of adoption known and settled rules and usages, which form a part of the law of the state in reference to which the constitution is evidently framed.

Historic precedents have left to legislatures, the choosing of their own officers,<sup>13</sup> the determination of their own rules of proceedings,<sup>14</sup> and the election and qualification of their members.<sup>15</sup> These so-called "inherent rights" were recognized by the United States Supreme Court in *Field v. Clark*<sup>16</sup> which held, among other things, that courts may not look behind legislative acts, once certified to as correct by their presiding officers, to determine whether their rules of procedure have been complied with.

While no doubt Congress could defeat the internal workings of state legislatures by simply refusing to recognize their actions if they did not comply with congressional mandates, it would be more prudent in the light of court decisions and historical precedents (1) to recognize the established rule that deliberative bodies regulate their own proceedings and (2) to accept state applications when certified to, as having been validly adopted.

#### CONTROL OF CONSTITUTIONAL CONVENTIONS

Probably the most vital question relates to the power of Congress to bind a constitutional convention, or, to put it another way, the power of a convention to ignore Congressional acts seeking to restrict the scope of its deliberations. Assuming the right of Congress, for example, to call a convention into being, has it the further right to impose restrictions upon its actions and subject it to restraints?

Before considering the power and scope of a constitutional convention, it is important to distinguish between a revolutionary convention and a constitutional convention. A revolutionary convention is part of the apparatus of a revolution. Jameson says it consists of those bodies of men who, in times of political crisis, assume or have cast on them, provisionally, the function of government.<sup>17</sup> They supplant the existing government.

A constitutional convention, on the other hand, as its name implies, is constitutional and is within rather than outside the pale of fundamental law. As Jameson states it, constitutional conventions are "ancillary and subservient and not hostile and paramount" to existing governments.<sup>18</sup>

A constitutional convention, therefore, that presumes to overpass the limits imposed upon it by its creators and seeks to do acts requiring the exercise of revolutionary powers, would cease to be a constitutional convention.

While the power to control a convention has never been determined by the courts or by the Congress, it seems that the whole scheme, history, and development of our government, its laws and institutions, require the control of any convention. Since a convention is called by Congress at the request of the states, and since both, in the final analysis, represent the people, the ultimate source of power, a federal constitutional



convention, to act validly, would have to stay within the designated limits of the Congressional act which called it. This does not mean that the convention may not exercise its free will on the substantive matters before it; it means only that its free will shall be exercised within the framework set by the act calling it into being.

It may be asked whether the convention, once convened, may adopt extralegal means in proposing amendments. A theory being urged today especially by the Communist party in America, is the so-called "right of revolution". According to its supporters, the "right of revolution" is a concept recognized by our Constitution and protected by it.

If such a theory be valid, it could be argued, since it presupposes changing our form of government in a manner other than that provided for in Article V, that a constitutional convention, once convened, could disregard Congressional directions and Article V and adopt extralegal means in establishing a new and revised constitution.

This doctrine was denounced in *Dennis v. United States*,<sup>18</sup> where the petitioners, leaders in the Communist party in the United States, were indicted for conspiring to teach and advocate the overthrow of the United States by force and violence.<sup>19</sup> It was argued, on their behalf, that the people as sovereign have an "historically established right to advocate revolution" and that the Constitution recognized that "right".<sup>20</sup>

Judge Learned Hand, in denying that such a right exists under the Constitution, succinctly held that no government could tolerate it and exist.<sup>21</sup> He stated that revolutions are often "right" but a "right of revolution" is a contradiction in terms, for a society which acknowledged it would have to tolerate conspiracies to overthrow it.<sup>22</sup> The Supreme Court, in affirming the Court of Appeals, observed that the Constitution can only be changed by "peaceful, lawful and constitutional means".<sup>23</sup>

In connection with the issue of control of constitutional conventions, argument has been made that the convention method of amendment contemplates only general or complete revision of the Constitution and not piecemeal amendment. This argument is somewhat unrealistic since it would negate amendment by the alternative method of convention. The founding fathers intended this method to be workable and incorporated it into the Constitution to permit the states to initiate changes if Congress became oppressive or was unwilling to act.<sup>24</sup> Certainly such an intention contemplated separate amendments as well as general revision. This view is supported not only by the constitutional debates at the time of the Convention in 1787, but by many eminent legal authorities since then. Furthermore, as a matter of historical precedent, the states have been submitting applications on specific subjects over the years, with the number of applications for limited conventions far outnumbering applications for general conventions.

## SUBMISSION AND WITHDRAWAL OF STATE APPLICATIONS

A convention, under Article V, after the constitutional application, does not automatically come into being. It must be called by Congress. The founding fathers intended that Congress should be required to call a convention and expressly provided in Article V that Congress "shall call a Convention". Among other reasons, they wanted to insure the right of the states to change the Constitution in the event Congress became oppressive. It is doubtful, however, that there is any legal process or machinery to compel Congress to perform its duty if it is unwilling to do so. Courts, most likely, would refuse to entertain actions to accomplish this end for the same reason they have refused to issue mandamus writs on the President of the United States—the doctrine of separation of powers.<sup>25</sup>

However, whether Congress, assuming it is willing, should act, and when, raises still further problems. Does an application remain always alive, or can it become legally ineffective because of a lapse of time or another intervening factor?

In dealing with an analogous question, the Supreme Court thought that ratifications of a proposed amendment by the states ought to be reasonably related in time and that Congress could establish a "reasonable time" within which the states might act.<sup>26</sup> Applying this test to state petitions seeking a convention, an application once made should be valid for a reasonable time.

This conclusion raises the further question of what constitutes a "reasonable time". Orfield feels it should not be more than a generation.<sup>27</sup> Jameson takes the position that proposals for amending the Constitution reflect the sentiment of the people at a particular time, and action must be taken while the sentiment is fairly supposed to exist.<sup>28</sup> Congress, in proposing recent amendments, set a specific time limit of seven years.

Since this issue involves an appraisal of a great variety of political, social, and economic conditions, it would seem that any time period wherein conditions remain substantially unchanged would be an acceptable period. History has shown that seven years is acceptable, and in all probability longer periods of time would be reasonable too, so long as the political, social, and economic conditions do not change too greatly.

Concerning withdrawal of state applications, the present attitude among legislators at least, indicates that such action is permissible. Twelve states in the last fifteen years alone have adopted resolutions rescinding previously made applications.<sup>29</sup> Furthermore, many states submit applications for the sole purpose of prodding Congress into taking action on a proposed amendment pending in the Congress, without ever having any real hope that Congress would call a convention. To hold

these states bound to their petitions would not be politic or realistic. It would seem proper to permit withdrawal at least at any time prior to the time when two-thirds of the states have submitted applications for a convention on the same subject.

#### RATIFICATION OF REJECTION

Several writers have taken the position that since Article V in terms provides for only affirmative acts, once having ratified or rejected a proposed amendment, a state cannot change its action.

Congress has previously been confronted with these questions. The legislatures of Ohio and New Jersey first ratified the Fourteenth Amendment and then passed resolutions attempting to withdraw their consent.<sup>22</sup> This, Congress refused to permit them to do.<sup>23</sup> On the other hand, New Jersey, in connection with the Thirteenth Amendment, and Georgia, North Carolina, Virginia, and South Carolina, in connection with the Fourteenth Amendment, at first rejected these amendments, but subsequently ratified them. These ratifications were treated as valid in each case.<sup>24</sup>

The question of ratification came before the Supreme Court in *Coleman v. Miller*,<sup>25</sup> and was declared to be a political question, subject to determination not by the courts, but by Congress.

Because of the highly developed means of communication today, permitting daily information on the exact status of proposed amendments, Congress, as a practical matter, could permit states to withdraw their ratifications, and conversely, to ratify proposals which they had previously rejected, until such time as the necessary three-fourths of the states have ratified the proposed amendment.

While Congress refused to permit Ohio and New Jersey to withdraw their approvals of the Fourteenth Amendment, it should be pointed out that the ratifying action of the two states completed the number of ratifications necessary to make the Fourteenth Amendment part of the Constitution.<sup>26</sup>

#### CONCLUSIONS AND RECOMMENDATIONS

A compilation of the various state applications calling for a constitutional convention discloses that approximately two hundred applications have been made since 1789. These applications have covered many subjects: direct election of senators, limitation on federal taxing power, prohibition of polygamy, general revision of the Constitution, world federal government, repeal of the Eighteenth Amendment, presidential tenure, treaty making, taxation of federal and state securities, protective tariff, wages and hours, gasoline tax, tidelands problem, control of trusts,



grants-in-aid, popular ratification of amendments, constitutionality of state enactments, revision of Article V, and the Townsend Plan.

If the Constitution requires merely that the legislatures of two-thirds of the states submit applications, a convention has been long overdue. Even if the petitions were classified according to subject matter, a convention would be overdue since on three occasions, at least, the necessary two-thirds of the states have submitted applications seeking a convention on the same subject matter.<sup>20</sup> However, as already discussed, other considerations such as reasonable time, withdrawals of petitions, etc., have **a controlling effect on these issues.**

In addition, there are procedural questions which must be dealt with, among them such matters as the physical act of forming a convention, providing for its membership, and most important, outlining the scope of a convention's deliberations.

In as much as the courts have stated that these issues fall into the category of "political questions", not justiciable, Congress may resolve them by enacting implementing legislation setting up standards and guides to govern the application process and constitutional conventions. Proposed legislation in the form of two draft bills, set out in full in the dissertation, suggest means for disposing of these problems. In substance they provide:

#### ANALYSIS OF DRAFT BILL FOR CALLING A CONSTITUTIONAL CONVENTION

State applications for a convention may request either a general or a limited convention.

State legislatures may determine all procedural questions connected with the adoption of state applications.

Gubernatorial action is not to be required in application process.

Applications must contain certain basic data including the exact text of the state resolution.

An application, once submitted, remains valid for fifteen years and for such longer time as Congress deems necessary if two-thirds of the states have submitted applications on the same subject.

States may rescind their applications except when two-thirds of the states have valid applications pending on the same subject.

When the requisite number of applications have been received, Congress shall call a constitutional convention, and the Chief Justice of the United States shall preside until the convention is organized.

Each state shall have as many delegates as it has senators and representatives in Congress elected in accordance with state law.

Each state is to have one vote to be cast as the majority of its delegates decide.

The convention will be limited to the consideration of those subjects set out in the Congressional resolution calling the convention into being.

The convention will be in session not more than one year, and its proposals will be transmitted through Congress to the states for ratification.

Amendments proposed by the convention must be ratified by the states within seven years.

Gubernatorial action is removed from the ratification process, and states may rescind their action at any time prior to the ratification by the legislators of three-fourths of the states. A state may also ratify an amendment it has previously rejected.

Congress will determine all questions relating to ratification, and the Director of General Services, when the requisite number of states have ratified, will officially proclaim the new amendment to be part of the Constitution.

ANALYSIS OF DRAFT RESOLUTION AMENDING RULES OF THE HOUSE OF REPRESENTATIVES FOR PROCESSING OF STATE APPLICATIONS SEEKING CONSTITUTIONAL CONVENTIONS

The Speaker is to refer all state applications for constitutional conventions to the Judiciary Committees of the House and Senate.

Within sixty days after the beginning of each session of Congress, the Judiciary Committee must report to the House the number of petitions, according to subject matter, which have been received during the preceding fifteen years, together with the number of states which have rescinded their applications.

If, during a fifteen-year period, two thirds of the states have submitted applications on a particular subject, a resolution must be introduced in the House calling for a convention within two years for the purpose set forth in the state applications.

The resolution is to be referred to the Judiciary Committee which must report back to the House within thirty days or be automatically discharged.

The resolution is to be considered immediately by the House, and may be passed by a simple majority vote.

If, prior to taking action on a House resolution, the Senate passes a similar resolution, the House will nevertheless consider the House resolution, and if acted upon favorably, shall then substitute the House resolution for the Senate resolution and adopt the same.

In the absence of a House resolution, a Senate resolution shall be processed in the same manner as though it had been introduced as a House resolution.

A congressman may, at any time, inquire whether a sufficient number of applications have been submitted requiring the calling of a convention.

## CITATIONS

<sup>1</sup> Twenty-two amendments have been certified as part of the United States Constitution. Five amendments have been proposed by the Congress but have not been ratified by a sufficient number of states. They relate to (a) the apportionment of representatives in the House (submitted 1789), (b) the compensation of senators and representatives (submitted to the states in 1789), (c) acceptance by United States citizens of foreign titles of nobility (submitted 1810), (d) a proposal relating to slavery (submitted in 1861), and (e) child labor (submitted in 1924). (U. S., Congress, House, 83d Cong., 1st Sess., 1953, House Doc. 211, pp. 16-17.)

<sup>2</sup> Farrand, *The Records of the Federal Convention* (1937), II, 558. Madison posed these questions: "How was a Convention to be formed? By what rule decide? What the force of its Acts?"

<sup>3</sup> See *Coleman v. Miller*, 307 U. S. 433 (1939).

<sup>4</sup> Pennsylvania, *Session Laws* (1943), p. 922; Montana, *House Journal* (1951), pp. 596-597.

<sup>5</sup> In 1789 New York and Virginia sought a Constitutional convention.

<sup>6</sup> 285, U. S. 355, 365 (1932).

<sup>7</sup> *Hawke v. Smith*, No. 1, 253 U. S. 221 (1920).

<sup>8</sup> *Ibid.*, p. 227.

<sup>9</sup> Only two states had veto powers by the chief executive, Massachusetts and New York—Massachusetts, *Constitution* (1780), chap. 2, sec. 1, Thorpe, *American Charters, Constitutions and Organic Laws*, III, 1899; *Laws of New York* (1787), chap. 11.

<sup>10</sup> *Hawke v. Smith* No. 1, 253 U. S. 221, 229 (1920).

<sup>11</sup> Cooley, Thomas M., *A Treatise on Constitutional Limitations* (8th ed.; 1927) I, 267.

<sup>12</sup> In re Speakership, 15 Cal. 520 (1891).

<sup>13</sup> *French v. Senate*, 146 Cal. 604 (1905).

<sup>14</sup> *People v. Mahoney*, 13 Mich. 481 (1865).

<sup>15</sup> 143 U. S. 649 (1892).

<sup>16</sup> Jameson, John A., *A Treatise on Constitutional Conventions* (4th ed., 1887), p. 6.

<sup>17</sup> *Ibid.*, p. 10.

<sup>18</sup> 341 U. S. 494 (1951).

<sup>19</sup> 54 Stat. (1952), 671; 18 U. S. Code § 11 *et seq.*

<sup>20</sup> Brief of petitioners before United States Supreme Court p. 267, *Dennis v. United States*, 341 U. S. 494 (1951).

<sup>21</sup> 183 Fed. 2d 201 (2d Cir. 1950).

<sup>22</sup> *Ibid.*, p. 213.

<sup>23</sup> *U. S. v. Dennis*, 341 U. S. 494, 501 (1951).

<sup>24</sup> Farrand, *The Records of the Federal Convention of 1787* (Rev. ed. 1937) I, 203.

<sup>25</sup> *Mississippi v. Johnson*, 4 Wall. 475 (U. S. 1866); see also on political, non-justiciable questions Willoughby, *The Constitutional Law of the United States* (1927), I, 577.

<sup>26</sup> *Dillon v. Glavin*, 256 U. S. 368, 374 (1921).

<sup>27</sup> Orfield, Lester B., *The Amending of the Federal Constitution*, Chicago, Callaghan & Co. (1942), p. 42.

<sup>28</sup> Jameson, John A., *A Treatise on Constitutional Conventions* (4th ed.; 1887), p. 634.

<sup>29</sup> Alabama, 91 Cong. Rec. 6031; Arkansas, 91 Cong. Rec. 1209; Illinois, 98 Cong. Rec. 742; Iowa, 91 Cong. Rec. 2383; Kentucky, 97 Cong. Rec. 10973; Massachusetts, 98 Cong. Rec. 4641; Louisiana, 100 Cong. Rec. 9420; Maine, 99



Cong. Rec. 4311, Nebraska, 99 Cong. Rec. 6283; New Jersey, 100 Cong. Rec. 1143; Rhode Island, 95 Cong. Rec. 8, 96 Cong. Rec. 3266.

<sup>90</sup> U. S. Congress, 40th Cong., 2d Sess., *Cong. Globe*, p. 4070.

<sup>91</sup> 15 Stat. 709, 710 (1868).

<sup>92</sup> 14 Stat. 428 (1867), 15 Stat. 706, 708 (1868); *Coleman v. Miller*, 307 U. S. 433, 438 (1939).

<sup>93</sup> 307 U. S. 433 (1939).

<sup>94</sup> 15 Stat. 706, 707, 709, 710.

<sup>95</sup> Direct Election of Senators, Limitation of Federal Taxing Power, and Prohibition of Polygamy.



SUMMARIES OF DISSERTATIONS  
SUBMITTED FOR  
THE DEGREE OF DOCTOR OF EDUCATION





# PREPARATION OF PUBLIC SCHOOL ADMINISTRATORS FOR INSTRUCTIONAL LEADERSHIP WITH SPECIFIC REFERENCE TO COURSE OFFERINGS

by HELEN MARRS FLINT\*

## THE PROBLEM

This study is a search for ideas concerning ways in which universities can prepare school administrators for instructional leadership (the process of marshaling human and material resources of a community to produce and maintain an instructional program that meets the needs of students).

Concerned primarily with course offerings, it (1) examines existing courses offered by universities in the United States to prepare school administrators for their role in improving the instructional program, (2) investigates on-the-job needs of administrators as they work to improve the instructional program, and (3) presents the outline of a proposed doctoral level course designed to prepare school administrators for instructional leadership.

## PROCEDURE

After a review of the literature, an attempt was made to discover existing courses in instructional leadership. The catalogues of 90 colleges and universities which offer a doctoral degree in education were reviewed; postcards were sent to 70 universities requesting more definite information than was furnished by the catalogues; letters were written to 7 other universities which, on the basis of the catalogue review, appeared to offer courses of special interest in the study. These 7 universities were requested to furnish outlines of specific courses.

The next step was to determine what the administrator needs to know and do to fulfill his role as instructional leader. Depth interviews, group discussions, and a questionnaire were used to tap the experience of public school administrators in the Metropolitan Washington (D.C.) area. In the belief that there are basic problems in instructional leadership—regardless of geographical location—no attempt was made to extend the study over a wide geographical area. Depth, rather than breadth, was the aim in this creative type study.

Interview guides and the questionnaire were constructed to obtain three types of information (1) procedures which administrators follow to improve the instructional program, (2) problems which they en-

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counter as they work to improve the instructional program, and (3) opinions of administrators as to the professional education needed to prepare them for the role of instructional leadership.

Forty-eight depth interviews with superintendents, principals, and lay persons were used to learn what the superintendent needs to know and do to improve the instructional program; group discussions involving approximately 100 principals and supervisors were used to determine what the principal needs to know and do; group discussions were supplemented by questionnaires completed by 109 principals and supervisors. (Most of the principals and supervisors completing questionnaires had participated in group discussions; some, however, completed the questionnaires without the benefit of such discussions.)

Ideas gained through the steps just described were used in developing an outline for a doctoral level course entitled, "Instructional Leadership in School Administration".

#### REVIEW OF THE LITERATURE

The literature pertaining to the preparation of public school administrators for instructional leadership is somewhat limited. More has been written on the problems of over-all preparation than on the specific preparation for instructional leadership. There is, however, evidence of an increasing interest in the area of instructional leadership and some indication of an expanding body of literature related to it.

The literature describes a number of approaches which have been tried in efforts to improve over-all preparation programs for school administrators. These include (1) efforts to define the total job of the administrator, (2) attention to improvement of content and method, (3) on-the-job experimentation, and (4) study of the behavior characteristics of school administrators.

Although the literature stresses the importance of the administrator's role in improving the instructional program, it reveals relatively few studies concerned with what he specifically needs to know and do to fulfill this role. These studies have, for the most part, been done by the Cooperative Program in Educational Administration (CPEA). Among the few studies concerned with defining the administrator's role in instructional leadership are those done by (1) the Southern States CPEA to develop a "competency pattern" for administrators, (2) the Southwestern CPEA to define the role of the administrator in the analysis and improvement of instruction, and (3) the Middle Atlantic Region of the CPEA to test a list of 15 hypotheses on what the superintendent needs to know and do to improve the instructional program. These studies, while pertinent to the problem, do not appear to be sufficiently comprehensive for use in developing a program to prepare administrators specifically for instructional leadership.



## FINDINGS

## EXISTING COURSE OFFERINGS

Of the 70 universities queried by postcard concerning course offerings in curriculum for doctoral candidates majoring in educational administration, 65 replied. It was found that 86 per cent of the universities which replied require or recommend that the student take (or have taken) a general curriculum course or courses offered to all students. Only 9 per cent of those replying stated that they offer a course in curriculum designed specifically for school administrators. Some universities, however, while stating that they do not offer such a course at the present time, explained that they are revising their programs in educational administration and may offer such a course at some time in the future.

Course outlines and materials were forwarded by 13 universities. An examination of these materials revealed that 3 courses were particularly pertinent to the study because of content, 4 were of special interest because of teaching methods employed, and 6 were of general interest but not closely related to the study.

Most of the pertinent materials received from universities reflected the influence of the National Conference of Professors of Educational Administration and of the Cooperative Program in Educational Administration on over-all preparation programs for school administrators.

Bibliographies accompanying some of the course outlines gave evidence that reference materials for use in the courses are to be found only in scattered sources. There is little textual material dealing specifically with the administrator's role as instructional leader; similarly, there is little textual material applying information from related disciplines to problems of instructional leadership although most pertinent course outlines indicated the desirability of the inter-disciplinary approach.

## ON-THE-JOB NEEDS OF ADMINISTRATORS

The investigation of procedures followed and problems encountered by superintendents and principals as they work to improve the instructional program revealed that what administrators do and the problems they encounter are much the same whether the administrator is a superintendent or principal of either an elementary or secondary school. There are, however, some differences.

## Similarities

The findings common to superintendents and principals are as follows:

1. A major problem of administrators is finding time to work on the instructional program, because of other demands on their time.

rank order: (1) planning an instructional program to meet the needs of pupils, (2) creating an atmosphere which is conducive to cooperative, creative work on the instructional program, (3) interpreting the instructional program to the staff and community, (4) organizing effectively for instructional improvement, (5) evaluating the program in terms of established objectives, and (6) providing in-service education for teachers. Skill in selecting personnel to work on the instructional program ranked almost as high as skill in providing in-service education.

RECOMMENDATION: A PROPOSED COURSE OUTLINE FOR  
INSTRUCTIONAL LEADERSHIP IN SCHOOL ADMINISTRATION

An outline for a three semester-hour course at the doctoral level was developed. The proposed title is "Instructional Leadership in School Administration". The course was designed within the framework of The George Washington University School of Education experimental program for doctoral candidates preparing for positions of leadership in school administration. (The experimental program, instituted in 1954, provides for doctoral courses involving an inter disciplinary approach, more first-hand field experience, greater use of group procedures, and a different procedural content.

The course was designed specifically for doctoral candidates in the School of Education of The George Washington University and for administrators in the field who, because of previous education and experience, are qualified to profit from such a course. It was assumed that students enrolled in the proposed course would have had a general course in curriculum development on the undergraduate or graduate level. Furthermore, it was assumed that students would have had courses or equivalent experience in such phases of educational administration as cooperative planning, group procedures, group dynamics, and personnel relations. Therefore, basic instruction in these areas is not included in the proposed course outline.

The plan of the proposed course provides for 4 single-class sessions (2 hours each) and 6 double sessions (5 hours each). It is proposed that the single sessions be devoted to an introduction to the course, orientation, review, and final examination. It is proposed that the double sessions conform, in general, to the following pattern: (1) first 2 hours devoted to orientation and presentation of new material using varied methods such as lecture and discussion led by a professor from a related discipline or by a field administrator; (2) luncheon period lasting from 1 to 1½ hours during which the group is addressed by an outside speaker or there is a student-led panel; (3) last 1½ hours during which small groups of students engage in problem-solving discussions and then come together for a plenary session.

It is proposed that the title and objectives of the 6 double sessions be as follows:

1. *The Administrator as a Resource Person.*—(1) to clarify the concept of the administrator's role as a professional resource person, (2) to identify the sources of information which are available to the administrator and to learn how to use them most efficiently; and (3) to learn how the administrator, serving as a resource person, can stimulate the professional growth of the staff.

2. *Utilizing Available Resources to Improve the Instructional Program.*—(1) to identify the available material and personnel resources, (2) to provide for a functional organization for program improvement, (3) to perform efficiently the management function of material support for the instructional program, and (4) to develop skill in making efficient use of time.

3. *Cooperative Planning for Program Improvement.*—(1) to learn how to use the planning process in improving the instructional program, (2) to find ways of encouraging the participation of many persons in determining broad objectives of the instructional program, and (3) to learn how to evaluate the planning process.

4. *Problems in Human Relations.*—(1) to identify the kinds of human relations problems which the administrator may encounter with the Board of Education, public, staff, and pupils when attempting to improve the instructional program, (2) to learn to recognize the basic causes of these problems, and (3) to develop skill in preventing human relations problems from occurring and to deal with those that arise.

5. *Communicating about the Instructional Program.*—(1) to identify the special problems which arise in communicating about the instructional program, (2) to develop skill in establishing effective channels of communication on instructional problems, and (3) to develop an understanding of communication as a two way process.

6. *Evaluating the Instructional Program and the Leadership Effecting It.*—(1) to identify the various means of evaluating the effectiveness of the instructional program in terms of established objectives, (2) to learn how to evaluate the effectiveness of the administrator's leadership in improving the instructional program, (3) to develop skill in promoting cooperative research, and (4) to learn how to use the results of evaluation in improving the instructional program.

The outline for the proposed course is presented as a guide in establishing such a course; it is in general terms, with the scope of the content sketched somewhat briefly and some references suggested. It will be necessary for the professor in charge of the course to prepare a detailed syllabus for it.

Some problems anticipated in offering the course are pointed out. They are concerned primarily with (1) orienting resource persons so



that they will bring their knowledge and experience to bear upon the problems of instructional leadership under discussion, (2) developing written materials which provide background information for each unit and synthesize pertinent information from related disciplines, and (3) planning carefully with individual students so that the student's job situation can be utilized in his professional preparation for instructional leadership.

#### CONCLUDING STATEMENT

It is recommended that The George Washington University School of Education offer the course, "Instructional Leadership in School Administration", on an experimental basis. If this is done, continuous, co-operative, and comprehensive evaluation of the course will be necessary; adjustments in content and method should be made on the basis of the evaluation. Furthermore, it will be necessary for the professor in charge of the course to keep abreast of current and future studies related to the course and to apply the findings to it. The field of instructional leadership is a dynamic one. The course outline is proposed, not as a final solution, but as one step forward in the better preparation of school administrators for instructional leadership.

# OPERATIONAL AND SUPERVISORY PRACTICES IN LARGE CITY GUIDANCE PROGRAMS WITH SPECIAL REFERENCE TO A COMPARATIVE ANALYSIS OF THE BALTIMORE PROGRAM

by MILTON THOMAS GOEDEKE \*

This is a study of the operational and supervisory guidance practices in large city school systems with special reference to a comparative analysis of the Baltimore program. Specifically, it attempts to discover the guidance practices in the cities of over 200,000 population.

In making the comparative analysis of the Baltimore program four categories were used: (1) guidance practices which Baltimore follows and which the majority (50 per cent or more) of the cities surveyed also follow, (2) guidance practices which the majority (50 per cent or more) of the cities surveyed follow but which Baltimore does not follow, (3) guidance practices which Baltimore follows but which the majority (50 per cent or more) of the cities surveyed do not follow, and (4) guidance practices which Baltimore does not follow and which the majority (50 per cent or more) of the cities surveyed do not follow.

Areas of operational and supervisory guidance practices included in this study were selected on the basis of three criteria: (1) the judgment of the writer stemming from a review of the literature in the field, (2) the judgment of professors of guidance and leaders in public education based on their extensive experiences in the field, and (3) the judgment of the writer in terms of his experience of 16 years in public education in a large school system.

## PROCEDURE

For the purpose of this study information was obtained from a questionnaire sent to the 53 cities of the United States with populations of over 200,000. In order to obtain a comprehensive picture of operational guidance practices, the largest portion of the instrument was concerned with operation. This first section was divided into five parts: professional personnel, services to pupils, services to adults, services to teachers, services to administrators, and organizational pattern. The part concerning services to pupils was subdivided to include categories necessary in a complete program of services to pupils; orientation, analysis of the individual—the individual inventory, counseling, occupational and educational information, placement and follow-up, and clinical services.

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There were 321 statements in this first section which were to be answered by checking either "YES" or "NO". In addition, there were 11 free response statements.

The second section of the questionnaire was concerned with the supervisory practices of counselors and contained 55 "YES" or "NO" statements and 4 free response statements.

The third and final section on trends and goals contained 29 "YES" or "NO" statements and one free response statement.

Responses were received from 52 of the 53 cities surveyed (a 98 per cent return).

#### REVIEW OF THE LITERATURE

In making an intensive review of the literature the facilities of the following sources were used: The Library of The George Washington University; The Library of the Department of Health, Education, and Welfare; the Library of Congress; the Library of the Department of Guidance and Placement, Baltimore Department of Education; and the Enoch Pratt Free Library, Baltimore, Maryland.

The literature revealed among other things:

1. A lack of comparative surveys or studies of the total practices in large city guidance programs.
2. A general agreement since about 1948 on the basic requirements and training of school counselors.
3. A need for the inclusion in guidance programs of student orientation services.
4. That a primary concern in the analysis of the individual is to help the individual to understand himself so that he may take appropriate action for self-improvement.
5. That the service of counseling constitutes the very core of guidance services.
6. That an adequate understanding of occupational life together with all of the related educational information is essential to the background of the counselor.
7. That placement and follow-up services are important and necessary phases of the total guidance program.
8. That the use of clinical techniques in helping individuals to adjust to behavior and personality problems is increasing.
9. A clear need for guidance services for adults as a public responsibility of the individual community.
10. That helping teachers to become more effective as guidance workers is an important aspect of the counselor's work.
11. That the counselor by virtue of his background of training and information has a responsibility for services to the school administrator.
12. That the organizational patterns for guidance services vary widely.



## SUMMARY OF THE FINDINGS

## Phase I

Baltimore and the majority of the other cities studied followed:

19 of the 64 practices concerning *professional personnel*

Example: In 92 per cent of the cities each counselor must have a valid certificate to teach.

5 of the 7 practices concerning *orientation*

Example: In 96 per cent of the cities the school counselor presents at group meetings of students information concerning schools which may be attended after completion of present program.

32 of the 67 practices concerning the *analysis of the individual*

Example: In 94 per cent of the cities whatever is known about a pupil is interpreted in the light of everything else which is known about the pupil.

14 of the 15 practices concerning *counseling*

Example: In 94 per cent of the cities the counselor initiates and leads individual conferences with individual teachers to discuss problems revealed through counseling.

18 of the 26 practices concerning *occupational and educational information*

Example: In 90 per cent of the cities the school counselor plans and leads college days and conferences for pupils with representatives from educational institutions.

6 of the 29 practices concerning *placement and follow-up*

Example: 76 per cent of the cities use the findings from follow-up studies to improve the guidance program.

All of the practices concerning *clinical services*

Example: In 93 per cent of the cities the counselor identifies pupils needing the help of a psychologist or psychiatrist and refers them to a proper clinic.

One of the 12 practices concerning *services to adults*

Example: In 73 per cent of the cities public evening schools offer guidance services for those adults who attend classes.

12 of the 19 practices concerning *services to teachers*

Example: In 94 per cent of the cities the school counselor exchanges information about the adjustment of pupils with teachers through conferences and written reports.

10 of the 20 practices concerning *services to administrators*

Example: In 98 per cent of the cities the school counselor recommends to administrators schedule changes for the individuals who need them.

24 of the 57 practices concerning *organizational patterns*

Example: In 73 per cent of the cities men from business, industry, and the professions are occasionally called upon for advice in planning and carrying forward a program of guidance.

35 of the 55 practices concerning *supervision*

Example: In 86 per cent of the cities visits of the central office supervisor are for the primary purpose of the improvement of guidance staff members through learning.

6 of the 29 statements concerning *trends and goals*

Example: 67 per cent of the cities stated that counselors were needed about equally at all levels of public education.

## Phase II

Among the 35 out of 405 guidance practices followed by the majority of the other cities but not by Baltimore were the following:

1. Psychologists are included as personnel of the guidance department in 61 per cent of the cities.
2. The school counselor in 63 per cent of the cities is responsible for preparing a handbook or guide for new students.
3. The school counselor in 57 per cent of the cities uses commercially prepared youth inventory forms to determine problems and needs of pupils.
4. Cross-checks by central office services for available information about a pupil are made in 51 per cent of the cities before new referral forms are requested from the schools.
5. In 67 per cent of the cities placement of school-leavers in initial jobs is carried on by the state employment service.
6. In 51 per cent of the cities the school counselor meets periodically with teachers to train them in the techniques and methods of guidance.
7. In 65 per cent of the cities the school counselor cooperates closely with the school administration in helping to determine the school curriculum.
8. In 63 per cent of the cities the idea that "every teacher be a counselor" is gaining in practice.

## Phase III

Fifty-seven of the practices followed by Baltimore but not by the majority of the other cities studied were concerned with operational items, such as

1. Each counselor must have at least five years of successful teaching experience.
2. In working with the group achievement tests, the school counselor is responsible for reporting results to the central office.
3. Educational information is presented to groups of pupils by elementary school counselors.
4. Placement of school-leavers in initial jobs is carried on by placement counselors whose offices are in the central office of the guidance department.
5. Guidance services for adults are provided by the city department of education.
6. The school counselor interprets for administrators curriculum desires of men from business, industry, and the professions.
7. The guidance department has on its staff an occupational and educational information specialist.

8. The supervisor of guidance makes written reports of school supervisory visits to the head of the city-wide guidance program.
9. The department of education is working in the direction of having a pupil-counselor ratio of 400 to one or less in the junior high school.

#### Phase IV

The most significant of the 115 guidance practices followed by neither Baltimore nor the majority of the other cities studied were

1. The requirement of an accredited Master's degree for counselors.
2. Planning and leading community occupational surveys by counselors.
3. Counselors' visits to business and industry for information on job possibilities for school-leavers.
4. Counselor handling of acute disciplinary cases for teachers.
5. Inclusion of psychometrists on the staff of guidance departments.
6. Supervision by guidance personnel of students' out-of-school activities.

And, finally, the study revealed that at no level of education was it felt in the majority of cities that there are yet enough counselors to provide an adequate guidance program for pupils.

#### Recommendations

As a base and focal point for study, review, and/or change of the Baltimore program, it is recommended:

1. That Baltimore scrutinize each of the 35 guidance practices and their implications which the majority of the other cities surveyed follow but which Baltimore does not follow. It is believed that in some instances that which has proven to be of value as shown by usage in the majority of cities of comparable size may be worth while to the Baltimore program.

2. That Baltimore review closely, with a view to value determination, the 68 guidance practices which it follows in its program but which the majority of the cities surveyed do not follow. Further, it is recommended that those of agreed value be made known to other cities of comparable size.

3. That Baltimore study in detail the 115 practices, item by item, which it does not follow and which the majority of the cities surveyed do not follow in an effort to discover those which may benefit the students and/or professional personnel through an improvement of the present program of guidance services.

4. That a system-wide committee of members from all levels of education in Baltimore be appointed to undertake the responsibilities for study as set forth in the aforementioned recommendations and to report their findings for action.



## SUGGESTIONS FOR FURTHER RESEARCH

The following types of studies are suggested in an effort to point out the need for continued related research in this area:

1. A status study, similar in scope and nature to the present study, of practices in programs in cities and/or counties of less than 200,000 population. The present study by no means intends that there are not worth-while practices in smaller systems which might serve well some of the needs of the larger metropolitan systems.

2. A national study which would effectively evaluate the various practices in the operation and supervision of large city guidance programs. Use of the conference and interview as techniques are recommended in this research.

3. A national study using pilot programs to determine the effectiveness of various patterns of organization of guidance services.

4. A national study of the public education programs of guidance services for adults with a view toward their improvement.

## CONCLUDING STATEMENT

This dissertation has surveyed the operational and supervisory practices in large city guidance programs and has made a comprehensive, detailed comparative analysis of the Baltimore program. Significantly, it has revealed that Baltimore's program is now using a high percentage of those practices which the majority of the cities of comparable size are following. However, even more significantly, it has revealed many practices which Baltimore is following that the majority of the surveyed cities are not following. This information it might well share with other cities.

# GUIDANCE SERVICES IN THE WHITE PUBLIC HIGH SCHOOLS OF NORTH CAROLINA

by FRANK GARDNER FULLER\*

## THE PROBLEM

This is an evaluation of the guidance services provided in the white public high schools of the State of North Carolina during the years 1950-1951. Its ultimate purpose is the improvement of these services. More particularly, the study is concerned with these aspects of an organized guidance program: (1) the individual inventory, (2) informational services, (3) counseling, (4) placement, (5) follow-up, and (6) group activities of a guidance nature.

The evaluation includes a determination of need for guidance services based on a study of the problems faced by young people, their knowledge of guidance, and the influence of socio-economic factors. It also includes a study of the influences of the State Department of Public Instruction and other state agencies.

## PROCEDURES

In addition to a study of the literature, the procedures included the following:

1. The administration of the Mooney Problems Checklist and the Kefauver-Hand Guidance Test, Illinois Revision, Form A to every fourth youth on the rolls of all high schools in three representative counties of North Carolina.

2. The determination of the presence or absence of elements of an organized guidance program through the compilation of data gathered from the schools in the three representative counties using Section G (Guidance Services) of the Evaluative Criteria of the Cooperative Study of Secondary School Standards, American Council on Education, 1950 Edition.

3. Case studies on two of these schools using Section G (Guidance Services) and Section B (Pupil Population and School Community) of the Evaluative Criteria, Cooperative Study of Secondary School Standards, 1950 Edition.

4. A check on the Criteria Data through an evaluative questionnaire sent to the principals of seventy-two white public high schools selected by the State Supervisor of Guidance Services on the basis of the presence of a guidance program to evaluate.

\* B.S. from Aurora College, A.M. in Ed. 1947, The George Washington University; F.D. 1957. Professor in charge of research. Mitchell, Deese, Professor of Educational Psychology.

5. The collection of data on the organization of public education in North Carolina, the services of the State Department of Public Instruction, and the services of the Guidance Services Section of the Vocational Education Division of the State Department of Public Instruction from publications of the State Department of Public Instruction.

6. The collection of data on the services of the various agencies of the State of North Carolina from publications of the Board of Public Welfare, Board of Health, Division of Vocational Rehabilitation of the Department of Public Instruction, Employment Security Commission, Commission for the Blind, Industrial Commission, Department of Labor, Department of Conservation and Development, and the Recreation Commission.

7. The collection of socio-economic data from publications of the North Carolina Department of Conservation and Development, United States Census Bureau, University of North Carolina, North Carolina Department of Health, and the North Carolina Board of Public Welfare.

8. The collection of information on guidance training available for teachers and counselors in the State of North Carolina from a publication of the United States Department of Health, Education, and Welfare.

#### REVIEW OF THE LITERATURE

A thorough search of the following types of literature was made in conducting this study. First, the literature was reviewed for studies on guidance in North Carolina Schools. Some information was found, but it was scanty in quantity and limited in scope. Second, the literature was searched for similar studies in other states. Three types of publications were found: (1) annual reports revealing the presence or absence of various guidance services (usually compiled from principals' reports), (2) reports dealing with certain special problems relating to guidance services, and (3) surveys of individual schools or school systems relating to guidance practice. Third, the literature was surveyed for assistance in methodology.

The search indicated that no study of the scope of this one, incorporating socio-economic factors, needs, school system data, etc., has been attempted in North Carolina or elsewhere.

#### FINDINGS

North Carolina presents a picture of rapid socio-economic changes with a school system that is not changing rapidly enough to meet these newer demands. Increasing urbanization; rapid industrialization; ex-



pressed needs of boys and girls in the areas of human relations, vocational choice, and educational guidance; students' serious lack of information in important areas of guidance—all indicate the need for improved guidance services in the public high schools.

This study has not only attempted to establish the need for guidance services but also to study the provisions for guidance services in the white public schools of the state. This required not only a study of the services in the schools themselves but also the organizational pattern of a highly centralized state-supported school system. The major weaknesses revealed by the study are:

1. Insufficient financial support from the state level to local programs of guidance
2. Insufficient liaison between state agencies at both the state and local levels
3. An insufficient number of properly trained guidance specialists at the local level
4. Lack of organization for guidance services at the local school level
5. Insufficient financial support for guidance services at the local level
6. Poorly organized and maintained student guidance records in local schools
7. Insufficient use of objective standardized tests in local schools
8. Insufficient amounts of properly indexed and filed occupational, educational, and personal social problems literature in local schools
9. Inefficient means of disseminating information described in "8" above
10. Insufficient counseling available to students in the schools
11. Virtually nonexistent placement services in local schools
12. Little organized cooperation between schools and public job placement agencies
13. Virtually nonexistent follow-up activities in local schools
14. Few schools with organized group activities in guidance to assist in such problems as orientation, vocational choice, curriculum choice, etc.

The recommendations which follow are designed to improve conditions described in the preceding discussion.

#### RECOMMENDATIONS

**Organization.**—In considering recommendations for the proper organization for guidance, it is necessary in a highly centralized school system to consider both state and local responsibilities. The State of North Carolina, through the State Department of Public Instruction, should immediately do the following things:

1. Give recognition to the importance of guidance by changing the Guidance Services Section from a subordinate status in Vocational Education to that of a special service with direct responsibility to the Assistant State Superintendent in charge of instruction
2. Provide the State Supervisor of Guidance Services with two full-time

- assistants in order to serve more adequately the large geographic area of a state with nearly a thousand high schools.
3. Provide funds for hiring guidance supervisors in the one hundred county school systems with the supervisors' services to be shared by any city school systems located in a county.
  4. Require guidance supervisors recommended in "3" above to be duly trained and certified as counselors within a period of not more than three years.
  5. Take steps to form a state level interdepartmental committee with representatives from all state departments (State Department of Welfare, State Employment Security Commission, etc.) the purpose of which would be to improve services to youth, to exchange information of vital importance to youth, and to encourage cooperation between local schools and referral agencies.

From the long-range point of view the State should consider the following recommendations:

1. Provision of guidance workers for all high schools (later, all elementary schools) by including counselors in the state allotment of personnel for local schools on the basis of one full-time counselor for every 500 students, as is done in Maryland.
2. Reduction of the counselor load recommended in "1" above as soon as feasible (possibly to a ratio of 1:250).
3. Satisfaction of North Carolina State Counselor Certification requirements (see "1" and "2" above) within a period of three years from the time of employment.
4. Adoption of books and materials of a guidance nature for grades 1-12 in the public schools of the State.

Local school systems should immediately consider the suggestions listed below:

1. Allocation of local funds for hiring a trained counselor to direct the guidance program.
2. Appointment of a guidance committee composed of teachers, students, and parents and headed by the counselor if one is available in the school, to study the guidance program of the school, the needs of the students, the available resources in the community and to make realistic recommendations based on these findings.
3. Implementation of suggestions made by the committee mentioned in "2" above by using all available resources in the community and the school.
4. Provision of funds for books, pamphlets, and materials to be used in the guidance program.
5. Provision for time in the school daily schedule for guidance activities.
6. Provision of the proper space and equipment for guidance activities.
7. Use of guidance specialists from county colleges and universities on a consulting basis in getting the program started.
8. Use of available resources for guidance in-service training for all school personnel concerned.

**Individual Inventory.**—Recommendations relating to the individual inventory, defined earlier in this dissertation as a continuous, systematic record of student development, are listed as follows:

1. The State Department of Public Instruction should immediately form a committee, under the direction of the State Supervisor of Guidance Services, and composed of college trustees, counselors, administrators, and teachers, to study the North Carolina Cumulative Record and, on the basis of this study, make changes deemed to increase the usefulness of the Record.
2. The State should make the North Carolina Cumulative Record forms available to all schools free of charge.
3. Local schools should develop systematic means of gathering student information needed for guidance purposes.
4. Local schools should initiate a cumulative record folder for every student enrolled.
5. Local schools should study ways and means of keeping records up to date without overburdening counselors and teachers with clerical duties.
6. Local schools should immediately institute standardized testing programs, setting up a plan of testing centers at colleges and universities.
7. Data from testing programs should be properly recorded on the cumulative record forms.
8. Teachers and counselors should receive in-service training on the importance and use of such methods of gathering information as standardized tests, anecdotal records, behavior diaries, rating scales, growth graphs, daily diaries, home visits, and questionnaires, etc.
9. Cumulative records should be accessible to teachers and counselors (within the counselor's office).
10. Systematic methods of interpreting information about students to them and to their parents should be developed.

**Informational Services.**—The presence in the school of adequate information on occupations, training, and the solution of personal problems and the means of bringing this information to the attention of students is essential to the proper operation of the guidance program. The following recommendations relate to this aspect of the school guidance program:

1. Local schools should immediately study ways and means of obtaining occupational, educational, and personal-social information.
2. Occupational pamphlets, monographs, briefs, and abstracts should be filed on a basic plan that follows the Dictionary of Occupational Titles.
3. An industry filing plan should be developed for filing information on industries.
4. Books, catalogues, etc., should be filed on special shelves in the library.
5. Teachers and counselors should receive in-service training in the use of such materials in group sessions and individual interviews.
6. The local school should develop systematic methods of using the information in regular classes, special guidance classes, or homeroom periods.
7. Provisions should be made for a continuous flow of up-to-date information into the school.

**Counseling Services.**—Counseling, a face-to-face personal relationship has been called the "heart" of the guidance program. The provision



of adequate counseling is certainly important if youth's personal problems are to be handled properly. There are probably no more important recommendations in this dissertation than the following:

1. Local schools should immediately see that at least one hour per day is devoted to counseling by some member of the faculty.
2. Local schools should appoint a counselor from the staff of teachers (or hire one already trained).
3. The appointed counselor should get the necessary training as soon as possible in order to be of maximum usefulness in the school.
4. Local schools should see to it that the counselor's time is devoted to individual work with students and to developing the school guidance program and that the counselor's time is not invaded by extraneous duties and responsibilities unrelated to guidance.
5. Local schools should provide adequate office space and the physical facilities important in establishing the relaxed, informal atmosphere essential to good counseling.
6. Local schools should maintain the cumulative records in the counselor's office.
7. Counselors in local schools should make sure that they have uninvaded time for counseling, proper physical facilities, and the necessary training to adequately assume their roles.
8. Counselors in the local schools should assist teachers in assuming their proper roles in the guidance program through in-service training, case conferences, etc.

From the long-range point of view, local schools should:

1. Plan to provide more than the minimum of one period per day for counseling as soon as possible.
2. Fully support efforts to have the State Board of Public Instruction include counselors in the allotment of school personnel.

*Placement.*—For the improvement of placement services, defined as giving an individual assistance in finding a suitable educational or job situation, the following recommendations are made:

1. The Employment Security Commission and the Guidance Services Section of the State Department of Public Instruction should work out plans for closer cooperation between local schools and local Employment Service offices.
2. Local schools should work out plans with local Employment Service offices for closer cooperation in the job placement of undergraduates in part-time and summer employment and the job placement of school drop-outs and graduates.
3. Local schools should assist students in selecting and gaining admission to appropriate schools, colleges, technical institutes, etc., in line with their vocational choices.
4. Local schools should appoint a committee consisting of the principal, counselor, and interested teachers to assist in making decisions on promotion or nonpromotion of individual students.



*Follow-up.*—All school activities should be subject to an evaluation of their effectiveness. Guidance services can best be evaluated by instituting a follow-up of drop-outs and graduates to determine the strengths and weaknesses of the program. Essentially, then, follow-up is a research service to determine whether former students have been well-served by the school guidance program and whether further help is needed. The following recommendations relate to this phase of guidance:

1. Local schools should institute a regular, systematic follow-up of all graduates and drop-outs.
2. The follow-up should be conducted by mail questionnaire at intervals of one year, three years, and five years after the student has left school.
3. Local schools should be prepared to render further guidance to those needing it.
4. Local schools should compile the data from these follow-up studies yearly and make revisions and improvements in their guidance programs accordingly.
5. Local schools should prepare school-leavers and graduates to expect the follow-up and emphasize its importance in order to insure a high percentage of responses.

*Group Activities.*—Much can be accomplished through group consideration of individual problems. Two major contributions of group activities are therapy and the provision of needed information to large numbers of students at the same time. The following recommendations relate to this important phase of the guidance program:

1. Local schools should plan for systematic group activities in the following areas, (a) orientation to new situations, (b) educational planning (including curriculum choice), (c) human relations, (d) development of human personality (including understanding of human behavior), (e) occupational exploration, and (f) job orientation (including job getting and job progress).
2. Local schools should plan these activities as a regular part of the school program and not as an adjunct. (This can best be done through special classes in guidance, through inclusion, in a "core" course, or through units in English or social studies.)
3. Local schools should conduct these activities by modern methods of teaching rather than through textbook study (this would include group discussion, panel discussion, buzz sessions, audio-visual aids, visitation to industrial plants, etc.).
4. Local schools should see to it that teachers for these activities are well-prepared and well-supplied with the necessary materials and resources.
5. Local schools should carefully plan the activities so that students' interests and needs are met at the appropriate time and so that overlapping is avoided.
6. Local schools should see to it that the activities are organized in a way that provides flexibility in meeting students' needs.



#### FURTHER RESEARCH

As comprehensive a study as this is, there is still a need for further research projects. The author recommends the consideration of the following:

1. A study of the guidance services in *all* the high schools of North Carolina to include (a) a survey of student needs, (b) an evaluation of the guidance program by applying the Criteria or some such similar device.
2. The recommendation in "1" above should include Negro as well as white high schools.
3. A study of guidance needs of elementary school children and the guidance services to be provided by North Carolina elementary schools.

#### CONCLUDING STATEMENT

This study is a comprehensive analysis of socio-economic factors, students' needs and problems, educational factors, and the provision of guidance services in the white public high schools of North Carolina. Collectively, the data presented indicate a state in which rapid change is taking place but which is providing inadequately for guidance services both on the state and local levels. A careful perusal of the recommendations and the data on which they are based should lead to action to alleviate this serious gap in the educational system. Other states, too, would be well-advised to study comprehensively their own situations with a view to improvement in the provision of guidance services for their youth.



